TECHNOLOGY DEPARTMENT

OCTOBER
1932

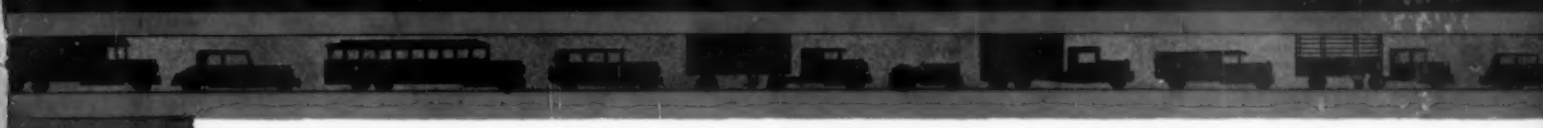
TECHNOLOGY DEPARTMENT

First Copy

FLEET OWNER

THE FERGUSON PUBLISHING CO., 90 WEST ST., NEW YORK, N.Y.

Devoted to the Better Operation and Maintenance of Truck, Bus, Taxicab, Passenger Car and All Automotive Fleets

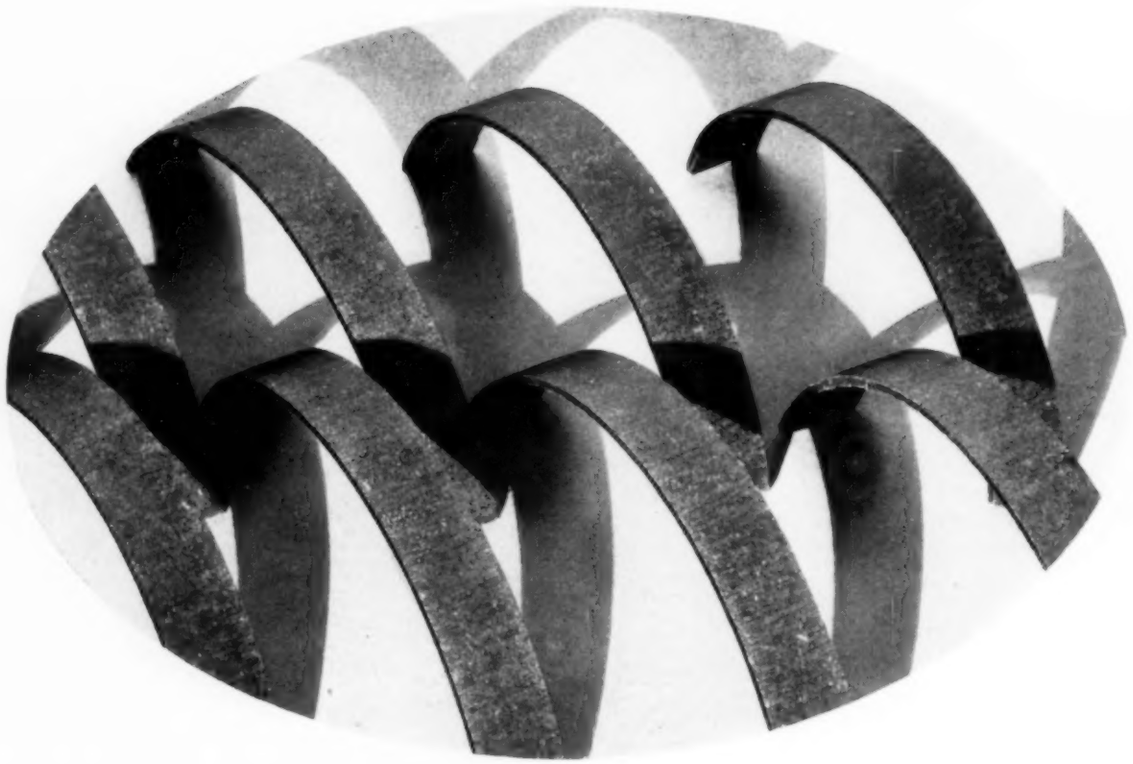


This Month's Features . . . . . E

- Maintaining an Oil Fleet
- Eliminating Fumes in Buses
- Analyzing Brake Failures
- Factors Affecting Lubrication
- Idling Motors or Anti-Freeze?
- Question-of-the-Month Club

—and Our Usual Departments

GREATER ECONOMY



Now Possible in Brake Lining Maintenance for PLYMOUTH, CHEVROLET AND FORD

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American Brakeblok in sets for these cars is exactly the same as the American Brakeblok for larger and heavier vehicles. It is a new type of lining—a dense, homogeneous, nonmetallic solid containing no rubber. It is formed under pressure, heat-treated and accurately ground to size—unaffected by the extreme temperatures and pressures encountered in service.

American Brakeblok will give you longer service, uniform wear and a marked freedom from adjustment. It will give safer, quicker stops under all driving conditions. These are definite, proved advantages which will materially reduce your maintenance expense.

Specify American Brakeblok for your next relining jobs—whether for Plymouth, Chevrolet or Ford, or for your other equipment. We believe that if you will do this you will adopt American Brakeblok as your regular replacement lining, as countless other fleet owners have done. Complete information on this new-type safety brake lining will be mailed on request.

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SAVES MOTORS—

SAVES MONEY

DU PONT ANTI-FREEZE

REG. U. S. PAT. OFF.

METHANOL

THERE are seven good reasons why automotive men advise you to protect your fleet in cold weather with du Pont Anti-Freeze Methanol. Here they are:

1— It is economical to buy and use.

2— It does not readily boil off.

3— It has no unpleasant odor.

4— It gives complete radiator protection at low cost.

5— It maintains cooling plant efficiency.

6— It is colored purple for your protection and identification.

7— It prevents corrosion.*

DU PONT

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ANTI-FREEZE METHANOL

E. I. DU PONT DE NEMOURS & COMPANY

Ammonia Department, Wilmington, Delaware

*NO CORROSION

with du Pont Anti-Freeze Methanol

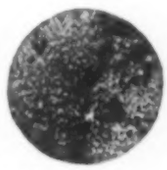
HERE'S PROOF

These photomicrographs show the results of a seven-week test of the corrosive action on engines and radiators of widely sold, low-priced anti-freezes compared with du Pont Anti-Freeze Methanol.

A few minutes after filling

ORDINARY ANTI-FREEZE

Rapid rusting (corrosion) resulting from using ordinary anti-freeze, shown by large increase in abrasive sediment.

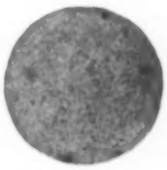


Seven weeks later

A few minutes after filling

DU PONT ANTI-FREEZE METHANOL

No noticeable increase in sediment shows rust (corrosion) protection afforded by du Pont Anti-Freeze Methanol.



Seven weeks later

GET PRICE AND DATA FROM YOUR DEALER, OR MAIL THE COUPON

FL-2

E. I. DU PONT DE NEMOURS & CO., Inc.,
Ammonia Dept., Wilmington, Delaware.

Gentlemen: Please send me prices and information on du Pont Anti-Freeze Methanol immediately.

Name.....

Address.....

City..... State.....

LONG LIFE AT LEAST COST WITH SKF DEPENDABILITY

ANOTHER "PERFORMANCE" USER
LaFrance-Republic Corporation

WHERE PERFORMANCE TAKES PREFERENCE OVER PRICE

"On all models we use SKF Self-Aligning Ball Bearings at the intermediate drive position," says the Chief Engineer of LaFrance-Republic. The proven dependability of SKF in this important location is the basic reason why SKF Performance Takes Preference Over Price.

On the Model Q shown, a 12 cylinder, 240 H. P. job, the SKF Self-Aligning Ball Bearing meets every demand of severe service ... day after day ...and there is never any doubt but that it will continue to do so ... without trouble and very little attention. The inherent feature of rolling self-alignment, plus precision, insures a long life of smooth and economical operation.

You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little.

2910

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Ball and Roller Bearings

Say "I saw it in FLEET OWNER"—It Helps!

The

FLEET OWNER

Published Monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops and devoted to the better Operation and Maintenance of Truck, Trailer, Bus, Passenger Car, Taxicab and all Automotive Fleets.

Vol. 9 New York, October, 1932 No. 4

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GASKET GOO has the same advantage. It sets solidly and is the perfect leak-stopper, but it cements the parts together so moderately that they can be taken apart by a tap with a block of wood. No delays, no breakage. It has everything—ALL IN ONE TUBE.

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Name_____

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Address_____

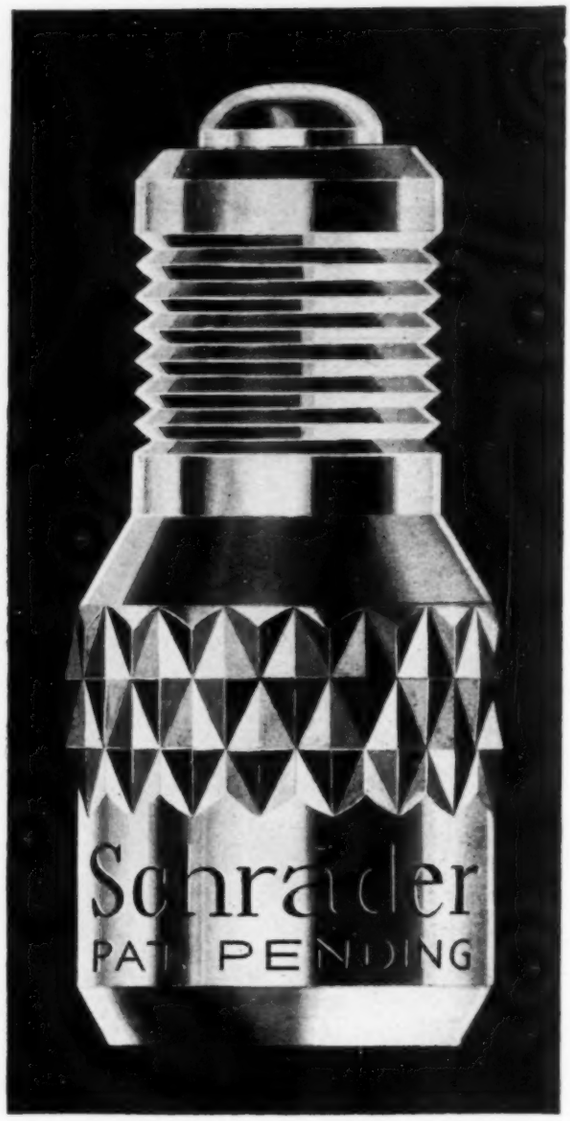
There is no let-up in the human desire for CONVENIENCE

And where there's Convenience there's usually Economy. The fleet owner who makes tire inflation easier will find his drivers less likely to neglect this very important requisite to maximum tire mileage.

The Schrader Dublchek Valve Cap has been designed for that very purpose. It does away with the usual valve cap and dust cap. Besides making inflation, deflation and air-gauging a tire a matter of seconds instead of minutes, it represents:

—A permanent cap that can't be lost.
—Guaranteed air-tightness up to 250 lbs. if affixed according to directions.
—An effective guard against dirt, dust and grit.
—A double check against loss of air.

And the name "Schrader" guarantees its quality! As a highly profitable investment in tire economy and time saving, equip your cars, trucks or busses with Schrader Dublchek Valve Caps. Obtainable through your regular source of supply. A. Schrader's Son, Inc., Brooklyn, Toronto, London.



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DUBLCHEK
VALVE CAP

No dust and valve caps to unscrew and replace. Four operations saved on each tire.

Inflate and test pressure through valve cap.

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Reg. U. S. Pat. Of
Makers of Pneumatic Valves since 1844
TIRE VALVES TIRE GAUGES
Be sure it's a Schrader — look for the name

VOL. 9
NO. 4

The FLEET OWNER

OCTOBER
1 9 3 2

Not "How Much?" Rather, "How Good?".....

The Editor's Page

THIS issue of your favorite publication might be termed an "oily" one, since our feature article is written around the activities of an oil fleet, another article outlines the various factors affecting fleet lubrication, and our Question-of-the-Month Club questionnaire covers the subject of engine lubrication. To make the tie-up complete, let's pass on to you a few of your Editor's most recent observations on the subject of lubrication. Here they are, and we'll try not to sermonize:

A few years back, many operators concerned themselves, perhaps unduly, over oil specifications—the kind of petroleum base—the kind of crude—the viscosity, flash and fire points of the lubricant—and a lot of other figures that sometimes were confusing. Many operators that we questioned on this subject did not hesitate to admit that although they bought oil "on specification" there was no yardstick available that would tell them whether or not the type of oil they were using was just right for their fleet or not. And then along comes someone with the theory that viscosity "doesn't mean a thing" and throws a monkey wrench into the works.

So, after all is said and done, it would seem that Old Man Experience is the real person to listen to, even though his lessons are sometimes expensive. The article on page 24, written from an unbiased standpoint, explains in a few paragraphs just how to go about acquiring the necessary experience. Perhaps you've had lots of experience, but not the right kind? Our suggestion is that you read the article, participate in the questionnaire on page 33 and make yourself eligible to receive a tabulated resumé of the complete survey. Then you will get the benefit of a flock of other operators' experiences, as well.

Whatever you do, pick a quality lubricant and don't buy oil on a price basis. The woods are full of inferior lubricants that you can get at practically your own price, but does it pay to take a chance on ruining expensive equipment?

It is not our job to play up any particular brand, type, or crude—that's up to the oil men and your best judgment. It would seem that the very best oil would be cheapest in the end, and the seemingly high first cost could be greatly minimized by the reclamation of crankcase drainings, which now seems to be generally recognized as a practical and successful procedure.

By J. F. Winchester

Motor Vehicle Superintendent, Standard Oil Company of N. J., Newark, N. J.

Maintenance Methods *in an* Oil Fleet

High-Spotting the Procedure Practised by Standard Oil Co. of N. J., and Some of Its Superintendent's Observations on the Subject of Fleet Maintenance

A FLEET of approximately seven hundred vehicles is operated by the Standard Oil Company of New Jersey, which includes trucks, trailers and passenger cars. A centralized repair shop is maintained at Newark, N. J., and repair stations are also located at the several sales branches of the Company. The writer supervises the activities of the motor vehicle equipment and also maintains a department for testing the various items of equipment and safety devices that are presented from time to time.

After a vehicle is installed in our fleet it is necessary to follow it up currently, in order to be sure that the various parts are being properly taken care of. We believe, after comparing various operating figures, that preventive maintenance is by far to be preferred, and produces lower transportation cost than does the practice of permitting the vehicle to operate without systematic care.

As a result of this procedure, we have built up a force that gives uniform attention to each vehicle throughout its life. Each vehicle is looked over by a general repair man at least once in every thirty days, and only comes in for overhaul when that condition is reached where it is considered advisable by all parties in the maintenance division so concerned.

The repair centers, located at our different sales branches, are completely equipped to take care of running repairs, unit replacements and even major overhauls, under the direct supervision of a shop foreman who in turn is responsible to the supervisor. In addition, each branch fleet is further grouped and there are several travelling mechanics or motor vehicle inspectors who make minor repairs and adjustments, also reporting directly to the motor vehicle supervisor.

With the advance in design of equipment and accessories, together with the use of pneumatic tires, there has been a gradual decrease in our operating costs over the period of the last five or six years. We are convinced that this decrease should continue, for the reason that factory production methods are being made available for all in many localities, and it is daily becoming more difficult for even the average passenger car to get away from an area where it cannot be properly serviced, or at least temporarily taken care of, regardless of what make or model of the vehicle might be.

As such facilities as these will gradually become common in community neighborhoods, it is only natural to assume that through closer inspection, more scientific lubrication and better repair work under more ideal conditions, the ultimate transportation cost to the public as a whole, and to the fleet owner in particular, will be, generally speaking, lowered.

We must not overlook the fact that now that the rush of production is over and greater application of scientific ideas has been made to the design of automotive equipment, it is reasonable to understand that the maintenance work is also receiving far more consideration than ever before.

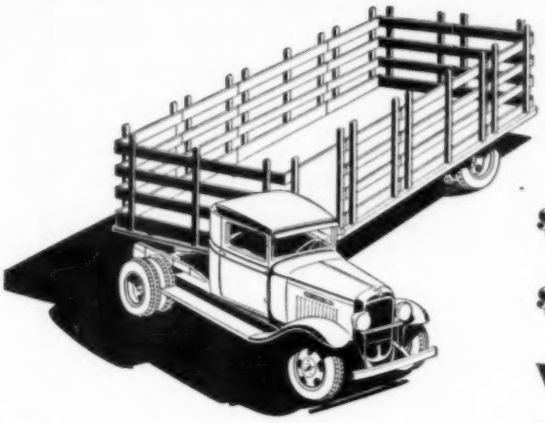
As before stated, in the case of our own Company, we have a Development Labratory that is working continually on all problems of this kind, which problems are frequently co-ordinated with the actual operation of the vehicles in the field, which results in theoretical and practical consideration being blended

Specialists All!

BELIEVING that a mechanic becomes more skillful and better able to turn out a satisfactory job as his knowledge of a specific group of units, such as engines, rear axles or transmissions increases, the motor vehicle department of the Standard Oil Company of New Jersey follows the practice of giving all work on similar units to the same men.

In this way, each man becomes a specialist, requires a minimum number of tools, and turns out better, faster work.

If you can do your job with tractor-trailers



You can save

$1400 *per unit* ON FIRST COST

$1170 *per unit on annual* OPERATING COST

WITH THIS 5-TON GMT OUTFIT

These are open figures that you can verify readily. The cost of a GMT 6-cylinder, 66-horsepower tractor and 3-5 ton trailer, complete with cab, fifth-wheel equipment, stake body, power brakes and 32 x 6 dual tires, is only $1,547, f. o. b. factory, $1400 less than the cost of a 5-ton truck. And the operating costs, as reported by owners in all parts of the country, average $1170 less per year.

Of course, there are jobs which can't be handled efficiently with a tractor-trailer combination, jobs which call for a straight GMT truck. But there are thousands of other hauling jobs that are wide open for savings like these. Consider *your* hauling operations carefully, or let a GMT representative advise you, and take every possible advantage of the new economies which GMT's make possible.

Get the facts on the new TT-218 3-5 ton trailer at

$347

Including Supports

GMT TRUCKS AND TRAILERS

THE IDEAL HAULING COMBINATION

Check these advantages

Many wearing parts of tractor and trailer are interchangeable.

•

GMT's have a greater service representation than all other leading makes of trailers combined.

•

Truck-type brakes are used on GMT trailers. Power actuation available.

•

"One-Man" Fifth Wheel enables the driver to couple and uncouple without assistance.

•

GMT "truck" design and manufacturing precision mean reduced weight, greater strength, greater payload capacity, and longer life.

GENERAL MOTORS TRUCK COMPANY
Pontiac, Michigan
Send me complete information on GMT truck-built trailers of the following capacities:_____
Name_____
Address_____
City and State_____ 35-J

GENERAL MOTORS TRUCKS AND TRAILERS

A "HOW-WE-DO-IT" ARTICLE *(Continued)*

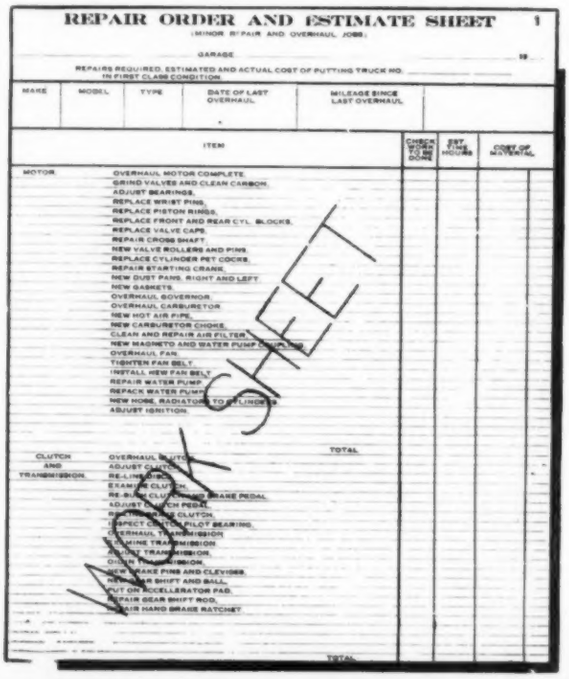
together in such a way that our products must give better satisfaction than ever before, with resultant benefits to the general public.

It is a well-established fact that large fleet owners, as a rule, take care of their own maintenance problems. This, of course, is the case in our organization. After a vehicle has been in service for a period of time, it is received at a central shop for general overhaul. Before it is permitted to go through the shop, however, a complete investigation and estimate is made of the work to be done and its probable cost. These are ascertained through the medium of the "Repair Order and Estimate Sheet", a sample of which accompanies this article.

In order that efficient work may be performed, certain special tools are necessary. Some of the most valuable ones that we use may be listed as follows: connecting-rod reboring tool; connecting-rod fillet retruing tool; main bearing boring tool; valve grinding unit; cylinder reboring tool; special brake lining testing apparatus; engine testing dynamometer.

We find through the use of accurate tools of this type that we can duplicate, to a certain degree, the actual manufacturers' operations in servicing our units. For instance, one type of reboring tool has been found very efficient in certain of our shops, while some of our other shops are fitted with a more expensive type of machine grinder, this before the former tool became standard, although the cheaper type has been found to be equally efficient and satisfactory.

After the motors are overhauled, they are run-in on the dynamometer and a record is kept of each individual job while it is being run-in. In connection with the use of the dynamometer, it has been found that it portrays accurately the condition of the motor, and through its use we have a more accurate knowledge than is possible with road testing. It is, of course, true that a practice of this kind cannot be


REPAIR ORDER AND ESTIMATE SHEET

(MINOR REPAIR AND OVERHAUL JOBS)

GARAGE 19

REPAIRS REQUIRED, ESTIMATED AND ACTUAL COST OF PUTTING TRUCK NO. ..... IN FIRST CLASS CONDITION.

MAKE	MODEL	TYPE	DATE OF LAST OVERHAUL	MILEAGE SINCE LAST OVERHAUL	

	ITEM	CHECK WORK TO BE DONE	EST. TIME HOURS	COST OF MATERIAL
MOTOR	OVERHAUL MOTOR COMPLETE			
	GRIND VALVES AND CLEAN CARBON			
	ADJUST BEARINGS			
	REPLACE WRIST PINS			
	REPLACE PISTON RINGS			
	REPLACE FRONT AND REAR CYL. BLOCKS			
	REPLACE VALVE CAPS			
	REPAIR CROSS SHAFT			
	NEW VALVE ROLLERS AND PINS			
	REPLACE CYLINDER PET COCKS			
	REPAIR STARTING CRANK			
	NEW DUST PANS, RIGHT AND LEFT			
	NEW GASKETS			
	OVERHAUL GOVERNOR			
	OVERHAUL CARBURETOR			
	NEW HOT AIR PIPE			
	NEW CARBURETOR CHOKE			
	CLEAN AND REPAIR AIR FILTER			
	NEW MAGNETO AND WATER PUMP COUPLING			
	OVERHAUL FAN			
	TIGHTEN FAN BELT			
	INSTALL NEW FAN BELT			
	REPAIR WATER PUMP			
	REPACK WATER PUMP			
	NEW HOSE, RADIATOR TO CYLINDER			
	ADJUST IGNITION			
	TOTAL			
CLUTCH AND TRANSMISSION	OVERHAUL CLUTCH			
	ADJUST CLUTCH			
	RE-LINE CLUTCH			
	EXAMINE CLUTCH			
	RE-BUSH CLUTCH AND BRAKE PEDAL			
	ADJUST CLUTCH PEDAL			
	RE-FACE DRIVE CLUTCH			
	INSPECT CLUTCH PILOT BEARING			
	OVERHAUL TRANSMISSION			
	RE-LINE TRANSMISSION			
	ADJUST TRANSMISSION			
	CLEAN TRANSMISSION			
	NEW BRAKE PINS AND CLEVISES			
	NEW GEAR SHIFT AND BALL			
	PUT ON ACCELERATOR PAD			
	REPAIR GEAR SHIFT ROD			
	REPAIR HAND BRAKE RATCHET			
	TOTAL			

SAMPLE SHEET

One section of the "Repair Order and Estimate Sheet," which serves as an inspection report as well. Additional sheets cover the balance of the units on each vehicle.

MOTOR-TRUCK CHASSIS-RECORD FORM

Standardized Mechanical Information Sheet, recently adopted by the Society of Automotive Engineers. This can be used for comparative purposes in selecting new vehicles.

adopted, except in large centralized operations, but it has proven to us conclusively that manufacturers' methods can be applied to the fleet repair shop with very satisfactory results being obtained.

In our operation, we endeavor to promote the economical servicing of automotive equipment through the keeping of actual records of the original installations and improvements that we may make from time to time. As a result of the benefits that are derived from this system, we advocated before the Society of Automotive Engineers (and they recently adopted) a standardized mechanical information sheet, a sample of which accompanies this article.

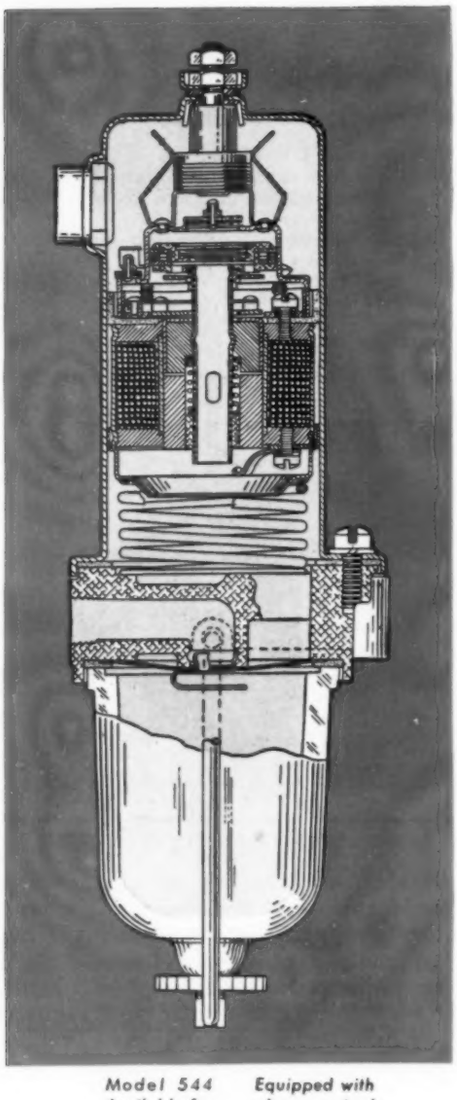
I would advise all fleet operators to insist that when a chassis is delivered to them that they obtain information of this kind. It will lighten their service problems materially and promote economical operation. Such forms have been in use for years, but the information has always been difficult to obtain, for some reason or other, from the manufacturers. At any rate, it certainly seems a logical thing to do, as it would assist in establishing a standard practice of supplying S. A. E. standard specification with each vehicle upon its purchase.

In fleet operation covering various types of businesses, it will be found necessary for the motor unit head to work with the accounting department to such a degree that there will be no duplication in the accounting work. This creates an effective set-up for the reason that both the operating head and the accounting department get their figures from exactly the same forms.

At least, this is what we have endeavored to do in our particular Company, and experience shows that to a degree it has been possible for us to have figures available that would give us an accurate portrayal

(*Please turn to page* 12)

In the new STEWART-WARNER Electric FUEL PUMP



Model 544 Available for 6 or 12 volts.

Equipped with glass or steel sediment bowl.

In gang assemblies, any unit may be cut out—without interfering with the operation of the active pumps.

NO—CONTACT POINTS —DIAPHRAGM —BELLOWS... TO CAUSE TROUBLE

In the new Stewart-Warner Electric Fuel Pump these mischief-makers, the cause of 95% of electric fuel pump failures, have been absolutely eliminated.

The Stewart-Warner is the only prime-moving, double-acting, piston-type electric fuel pump. It's the simplest—most dependable pump ever built and will deliver more fuel on less current than any other electric pump—about 3/8 of an ampere in average service.

For the hard, high speed service of motor coaches, where schedules must be maintained—it is the most economical insurance against fuel feed failure. Starts instantly in coldest weather—no vapor lock in hottest weather. Its maximum capacity is 25 gallons per hour, and tests equivalent to 200,000 car miles have proved its outstanding dependability. It may be installed easily singly or in multiple on the line—to replace or supplement your present fuel delivery system.

Get all the facts on Model 544. Address Stewart-Warner Corp., Chicago, U. S. A., or see one of our service stations.

ANOTHER STEWART-WARNER PRODUCT THAT KEEPS PACE WITH TODAY'S DRIVING NEEDS

KEEPING "STANDARD'S" FLEET RUNNING (*Continued*)

of just what is being encountered with motor transportation in our operations. We have accurate figures that answer the purpose of three departments, namely, Sales, Accounting and Automotive, with but very little duplication in work and expense.

After all, in the operation of motor equipment in various types of industries, there are many factors to be taken into consideration for most economical and efficient operation. Frequently, an evaluated experience is of such a character that it does not conclusively apply to the entire field of operations and as a result an answer to all the factors cannot be logically arrived at. As a result, it is necessary to conduct tests from time to time, that will give a definite answer to the problem at hand.

In the oil industry there are two types of vehicles most largely used—first, the tank truck, and then the stake truck. From time to time there is a point raised in the public mind as to whether or not it is safe to operate tank trucks on the public highway. In order that various factors in connection with such an operation might be established, we have run a series of tests on different kinds of containers, and have, as a result, surrounded this type of vehicle with many safety features that make it practically impossible to have an accident of a disastrous character.

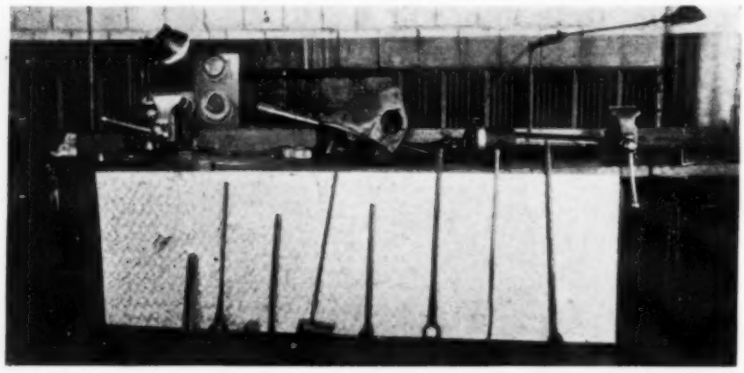
With the continued growth of aviation, it has been necessary to design certain types of vehicles to properly service this type of unit with gasoline and lubricating oil. One of these units, although not the very latest, is shown in the heading of this article. This truck is a regular tank truck, handling high grade gasoline, which is pumped through a meter directly into the tanks on the plane. No cans are used and the actual number of gallons pumped out of the tank can easily be read by the operator. There are lubricating oil tanks on the side of this truck, as well, and it is also equipped with an air pump to take care of the tires of the plane. Provisions are made, also, for supplying water to the plane, if necessary.

Other special types of units have been worked out in connection with our operations, which other operators are now becoming to recognize as logical ones. We refer to the carrying of greater pay-load, by the use of lighter materials, the use of six-wheelers, trailers, frameless outfits, etc. The largest vehicle in our organization has a gross weight of 60,000 lbs., and the smallest 1130 lbs.

Many diversified jobs are demanded of the vehicles in our fleet; besides some of the above mentioned ones might be mentioned the following: laying asphalt and other products on the highways; heating contents of tank cars before transferring to trucks; hauling industrial lubricating oil; hauling and delivering fuel oils for domestic and industrial use, etc. In our practice, in the design of vehicles, we have used a considerable number of aluminum bodies of both the tank and barrel body type. We have found them to be very efficient and believe that their ultimate use will eventually become very widespread.

In connection with the servicing of some of this more-or-less complicated apparatus, it is necessary, of course, to have intelligent, well-trained personnel. In our particular case we lay a great deal of stress

(*Please turn to page* 42)

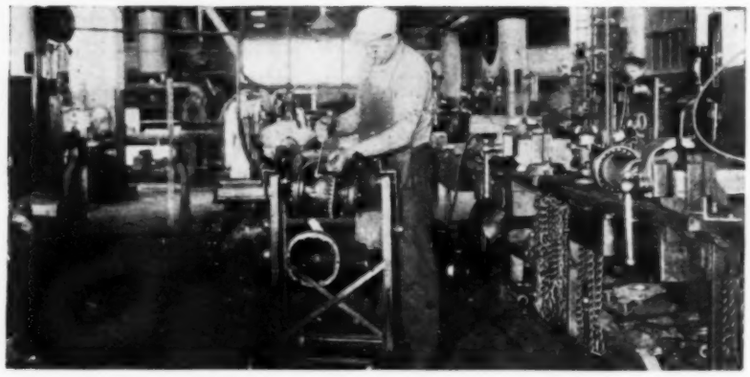


Some "Specials"

IN order that efficient work may be performed, certain special tools are necessary. Here are a few developed in the shops of the Standard Oil Company of New Jersey. These are a few of the "specials" for extra heavy-duty rear-ends and transmissions.

Good Posture

NO bending down and breaking your back when your shop has an assortment of engine, axle and transmission stands like those of the Standard Oil Company of New Jersey, illustrated here. This is your Editor's idea of the ideal way to work on a rear-end. What do you think?



"Already safety is looming as a possible motive for a new assault upon the consumer's complacency in his present car ownership. It is likely to prove effective, for 79 per cent of those consumers who were interviewed expressed an interest in having safety glass in their next car. Safety Glass, safety tires, more safe control, stronger bodies, more stable equilibrium, all will make owners of tomorrow think in terms of new motor cars. Increased speeds at which motor cars of the future will travel will continue to make such features seem necessary."

. . . from "The Passenger Car Industry", recently published by the Curtis Publishing Company, a Report of a Survey made by Charles Coolidge Parlin, manager of the Commercial Research Division, and Fred Bremier, assistant.

the handwriting on the wall

Some months ago the results of an authoritative survey in which approximately 150,000 motorists were questioned, were made public. They showed that 45% of all motorists injured in automobile accidents were cut by broken, flying glass. Furthermore, 85% of those answering stated that, when choosing cars of equal reputation and performance, they would select the car with Safety Glass in preference to the other *even if the cost of this protection made the price of the car slightly higher.*

• • •

The figures recently compiled by the Curtis Publishing Company bear out the findings of that previous survey. The *need* for Safety Glass, long obvious, is now followed by an almost universal desire and demand for it on the part of the public. When this preference is stated so emphatically with regard to individually owned automobiles, it stands to reason that the public will be doubly positive in its stand regarding Safety Glass in buses, taxicabs and all other vehicles for hire. That is why so many fleet owners are providing this essential safeguard as a further service to their passengers. The handwriting on the wall is very plain indeed. Public carriers without Safety Glass very soon will be obsolete.

LIBBEY-OWENS-FORD GLASS CO., TOLEDO, O., manufacturers of Highest Quality Flat Drawn Window Glass, Polished Plate Glass and Safety Glass; also distributors of Figured and Wire Glass manufactured by the Blue Ridge Glass Corporation of Kingsport, Tennessee. L·O·F Safety Glass is used by Packard, Graham, Studebaker, Franklin, Reo, Willys, Willys-Knight, Ford, Cadillac, La Salle, Lincoln and Nash. It is also used in Dietrich and Le Baron Custom Bodies, Reo Speed Wagons, Twin Coaches, Brill Trolley Buses, Cincinnati Trackless Trolley Coaches, Bender Bus Bodies, Hackney and Springfield School and Passenger Bus Bodies, White School Buses, York-Hoover School Bus Bodies, Crown School and Motor Coach Bodies, Ford School Buses, Stinson and Stearman Aircraft, Gar Wood Boats, Matthews Cruisers and Chris-Craft Cruisers and Runabouts.

LIBBEY·OWENS·FORD

SAFETY GLASS

Say "I saw it in FLEET OWNER"—It Helps!

By W. J. Cumming
General Superintendent, Surface Transportation Co., New York, N. Y.

Eliminating Gasoline Fumes *in* Buses

Steps We Have Taken Towards Mitigating Gas Fumes in Our Fleet of Buses—Ingeniously Designed Vertical Tail-Pipe Solves Difficulty. Exhaust Gas Analyzer, in Shop, Also Assists.

GAS fumes, a source of annoyance to the passenger and of complaint to the operator, have been attacked in a series of experiments by the Surface Transportation Company, the bus operating division of the Third Avenue Railway System, of New York City. These experiments, which have been in progress for nearly three years, have met with varying degrees of success, but from each step something has been learned that has been of interest and value in mitigating this evil.

Among the steps taken were: tightening the bodies and floors, flanging the exhaust piping system to make it leak-proof; extending the tail-pipe to the left rear end of the bus beyond the body skirt; drilling the carburetor butterfly to break the high intake manifold vacuum when idling; the use of various commercial devices to accomplish the same purpose as drilling the butterfly; the use of exhaust diluter for mixing the exhaust gas with sufficient air to cause it to be so diluted that it is odorless; running a stack up the back of the bus so as to carry off the exhaust gases; the installation of a series of fins on a section of the exhaust pipe ahead of the muffler so as to cool the exhaust gases, thereby reducing their pressure and volume; the use of "activated" carbon as a catalyzer for changing the chemical composition of the ex-exhaust gases; and the use of an exhaust analyzer when setting carburetors to prevent unburned combustibles in the exhaust.

All tests made and work done were aimed at control of the exhaust gases with the view of keeping them from entering the body of the bus, or to remove as many of the odors present in exhaust gases as possible, by means which would be simple and lasting and would not entail continuous and expensive maintenance. It is hoped that the devices adopted will last for at least 20,000 miles of operation without the necessity of further attention.

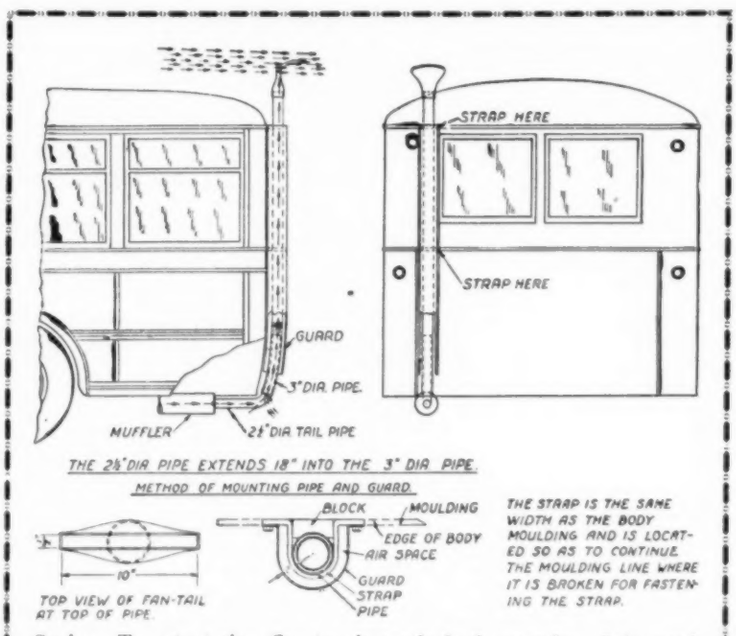
As a preliminary step, measures were taken to seal the floors and tighten the bodies of our buses in an effort to prevent seepage of exhaust gases through loose joints and through holes in the dash. As certain of the older buses were overhauled, the wooden floors with which they had originally been provided were replaced with floors of Chan-arch pre-formed steel, covered with Tucolith, a fire-proof, water-proof, fibrous, plastic material which is trowelled in place and hardens in eight hours. The number of openings in the dash board were reduced to a minimum and those that were retained were reduced in size and booted wherever possible. Some 60 buses are now equipped in this manner and this practice, with such improvements as progress suggests, is now standard with us.

In order to prevent as far as possible the exhaust gases from entering the interior of the bus, the tail-pipe was carried to the left rear corner of the bus, past the body skirt. With the view of obtaining tight joints between sections of the exhaust pipe, flanges were welded to the end of each section and so adjusted that a copper and asbestos gasket, formed in the shape of a ring, would be squeezed up and seal the joint when the flanges were pulled together with three one-half inch bolts.

This procedure was successful in carrying the gases out past the body, but we continued to experience a certain amount of trouble with fumes drifting in at the windows, especially when the bus was being brought to a stop with the wind coming from behind.

While the tests were being made, a chemist

(Continued on page 16)


STRAP HERE
STRAP HERE
GUARD
3" DIA. PIPE
MUFFLER
2½" DIA. TAIL PIPE
THE 2½" DIA PIPE EXTENDS 18" INTO THE 3" DIA PIPE.
METHOD OF MOUNTING PIPE AND GUARD.
BLOCK
MOULDING
EDGE OF BODY
AIR SPACE
GUARD STRAP
PIPE
10"
TOP VIEW OF FAN-TAIL AT TOP OF PIPE.
THE STRAP IS THE SAME WIDTH AS THE BODY MOULDING AND IS LOCATED SO AS TO CONTINUE THE MOULDING LINE WHERE IT IS BROKEN FOR FASTENING THE STRAP.

Surface Transportation Company's method of mounting their vertical exhaust tail-pipe at the rear of bus bodies. Note the guard which is a protection against rear-end collisions although collisions sometimes render the device practically inoperative.

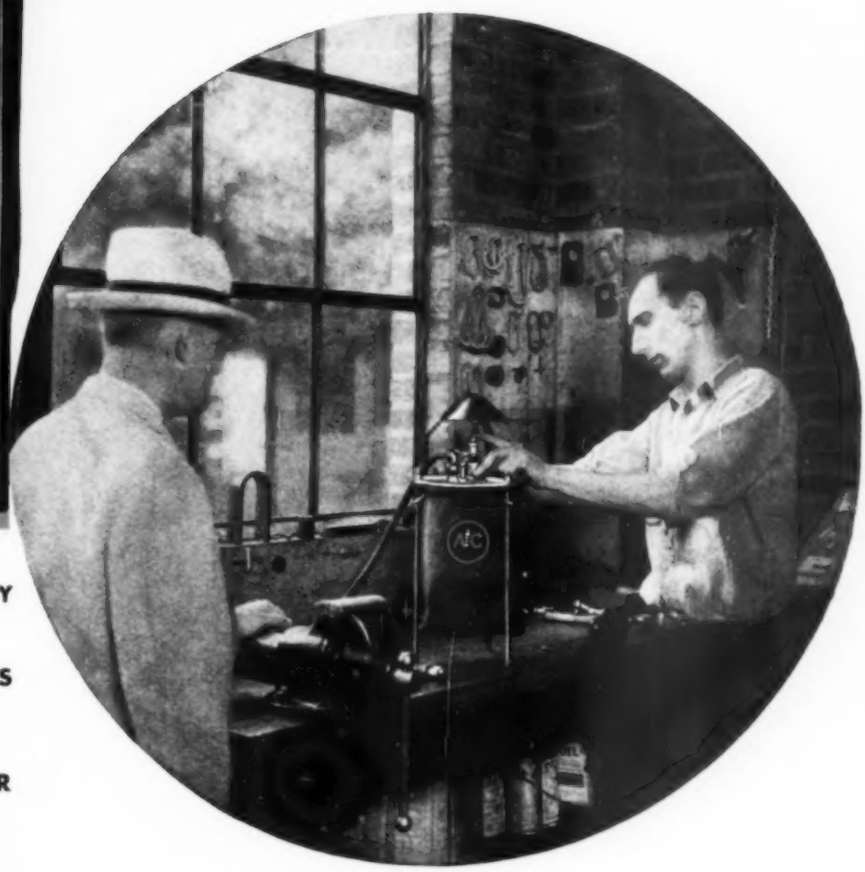
Something New—

A SPARK PLUG CLEANER

that cleans pluqs quickly and thorouqhly

AT VERY LOW COST

without damaqinq the insulator



- **A PRACTICAL TOOL FOR EVERY SHOP**
- **CAN BE INSTALLED IN 5 MINUTES**
- **OPERATES OFF THE AIR LINE**
- **DOES NOT HARM THE INSULATOR**
- **CLEANS A PLUG IN 5 SECONDS**
- **SAVES MUCH TIME IN TUNE-UP**

NOW, an air-blast spark plug cleaner that cleans thoroughly without damaging the insulator!

It employs a new cleaning compound especially developed for removing the oxide film and carbon and oil coating from spark plugs. Its specially-designed nozzle takes the wear so that the blast cannot destroy the insulator. A replacement nozzle, the only wearing part of the cleaner, is included with every 50-cent refill package of AC cleaning compound (enough for cleaning 200 to 500 plugs).

AC engineers developed this cleaning machine for use with ACs and other types of plugs. They made it prove its value in test installations before they OK'd it for you. They simplified its operation so that anyone can use it. And they produced it at the low price of $10, complete with cleaning compound and adapters for all sizes of plugs, all-ready to connect to your air line. It will pay for itself quickly in any shop. Order one today from your AC wholesaler. Or fill out and mail the coupon, to insure prompt delivery.

"IMMEDIATE DELIVERY" COUPON

AC SPARK PLUG COMPANY
Flint, Mich.
Gentlemen:
We want immediate delivery on _____ (quantity) of the new AC Spark Plug Cleaners at $10 each complete, as advertised in the October, 1932,

AC
THE QUALITY SPARK PLUG

Fleet Owner. Bill us through _____ (name of your AC wholesaler)

_____ (address of your AC wholesaler)

Name _____

Address _____

City and State _____

Say "I saw it in FLEET OWNER"—It Helps!

MINIMIZING COMBUSTION FUMES (*Continued*)

Special type of muffler developed by Surface Transportation System. It is built up from sections of standard mufflers, as shown. Eighteen sections are used, including tapered end-pieces. Same size pipe is used for inlet and outlet.

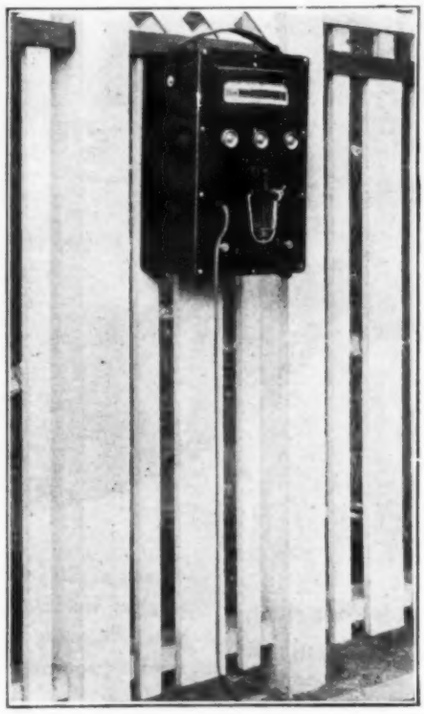
connected with the ventilation service of the Holland tunnel, conducted a series of tests which indicated that the maximum amount of carbon monoxide gas found in the air in our buses was three-tenths of one part in ten thousand parts of air, while the majority of his tests showed no trace whatever.

On a few of the buses the carburetor butterflies were drilled in an effort to reduce the high degree of vacuum which is usually present in the intake manifold when the engine is idling or being used as a brake when decelerating. It was our theory that under these circumstances a quantity of oil collected in the combustion chambers of the engine by being sucked past the pistons and piston rings because of the high degree of vacuum with closed throttle and that this oil in a partially burned state gave off the smoke and annoying odors erroneously called "carbon monoxide" when carried out into the atmosphere with the exhaust gases.

A 3/16 in. drill was used, so that the atmospheric air would be drawn into the intake manifold and combustion chambers, breaking the high vacuum and decreasing the quantity of oil. This helped to some extent, but because of its effect on the functioning of the carburetor and the operation of the engine when the hole was of sufficient size, it proved impractical.

A number of commercial devices were tested in an effort to accomplish the objective aimed at in drilling the carburetor butterflies. Most of these devices operated on the same principle, being so designed that when installed in the intake manifold, a high degree of vacuum in the intake manifold caused a spring-loaded valve connected to the outside air to be lifted off its seat, thus admitting air into the manifold. When the throttle is opened the vacuum is reduced, allowing the spring to close the valve and permitting the carburetor to supply the correct mixture for acceleration and maximum power.

The results obtained by the installation of these devices were little or no better than those achieved by drilling the carburetor butterflies as described above. There was no apparent decrease in the quantity or density of the exhaust gases. There was, however, a marked decrease in the mileage obtained per gallon of gasoline, making it more expensive to operate the buses so equipped. In actual tests the mileage figures obtained with buses thus equipped with 1.69 miles per gallon, while on buses not provided with these devices the mileage obtained was two miles per gallon. This represents a difference of 15 per cent in mileage performance. No difference in oil consumption was noted, however.



Type of exhaust gas analyzer used, which is expected to materially aid in setting carburetors for greatest power and maximum economy.

When we turned again to find a means of handling the gas after it left the engine and was ready to leave the tail-pipe, we tried a device which was designed to mix a much larger quantity of air with the exhaust gases so that the gases would lose their density, with a consequent reduction in odor.

This device consists of a box-shaped arrangement secured to the end of the tail-pipe, made with a series of air inlets in the sides and a clear passage for the exhaust gases. The action of the device is as follows: as the exhaust gases pass through it, their velocity draws air through the inlets in the sides by means of a Venturi action in such quantities as to thoroughly dilute them and thus reduce any unpleasant odors. This brought about a marked improvement, but the difficulty of keeping such a device on the tail-pipe where it was frequently broken or knocked off made the experiment impracticable in so far as our fleet with its low-hung bodies, operating in city service, was concerned.

Better success attended our attempts to divert the gases away from the bus by extending a pipe from the exhaust up the back of the bus. This device was tried on both single and double-deck buses. The stack provided is one half inch larger in diameter than the tail-pipe, which is turned up at the rear of the bus so as to extend into the stack for approximately 18 in. At the top the pipe was bent away from the bus at an angle of 45 degrees so that the outlet pointed away from the bus and was located above the highest point of the roof. Three baffles were evenly spaced in the stack so as to prevent any condensation being blown out.

In action, the rush of gases out of the tail-pipe into the stack drew along air from between the pipes so as to dilute the gases and make them less objectionable.

Results accompanying this experiment were satisfactory except at times when the wind was blowing from the back of the bus, in which event smoke and odors would occasionally be wafted into the bus body.

As a measure to overcome this difficulty the baffles were removed, the top of the stack cut off and a fan-shaped outlet provided so that a thin fan of gases was ejected straight up, presenting a wider front to the air stream. This solved the difficulty, there being no objectionable odors in the bus body at any time.

(*Please turn to page* 42)

Ward Baking Company buys 12 more Studebakers for its subsidiary Baur Brothers Bakery at Pittsburgh, Pennsylvania. Satisfactory experience has resulted in Ward Baking Company operating a fleet of 78 Studebaker trucks

Studebaker Service wins repeat orders

GOOD truck *service* means two things: Dependable performance of equipment and courteous, efficient assistance by dealer and factory—Studebaker popularity begins with exceptional performance and grows steadily as maintenance is required—Such truck service is winning *repeat* orders for Studebaker.

Studebaker trucks are powered with husky 6-cylinder 75 horsepower engines which develop 1 horsepower for every 3.06 cubic inch displacement—the most efficient engines in the medium duty field. Massive frames—big full floating rear axles—special truck springs—and every other essential feature is designed and built for dependability.

Studebaker trucks move their tonnage at lower net costs than any other truck built today. Low first cost, low maintenance and longer life all prove that Studebaker is giving the greatest values ever offered by any manufacturer—and every truck is built to traditional Studebaker quality standards.

1½-ton .	$ 670 to $ 745
2-ton . .	895 to 945
3-ton . .	1350 to 1425

All prices chassis at factory. Bumper, spare tire extra. Cabs and all standard bodies available on all chassis.

Studebakers are *profit-makers*

Say "I saw it in FLEET OWNER"—It Helps!

By Lieut. Geo. Andrews
Motor Vehicle Homicide Squad, Police Department, City of New York, N. Y.

Analyzing Actual Truck Brake Failures

How New York City's Police Department Analyzes the Causes of Motor Vehicle Accidents and Gets Down to Actual "Bottom" in Placing Blame Where It Belongs—Work of Homicide Squad is Splendid Example of Thoroughness of "New York's Finest"

THE Motor Vehicle Homicide Squad of the Police Department of the City of New York has a personnel of 2 lieutenants and 30 detectives. These men are experts in the examination and inspection of motor vehicles. The unit is notified of all fatal or serious accidents in which a motor vehicle is involved.

During 1931, the Motor Vehicle Homicide Squad investigated about 2,000 accidents. The mechanical features of the vehicles involved in these accidents were carefully examined.

In the majority of accidents where faulty mechanism was found, defective brakes were the cause of the accident. But in other cases faulty steering gear, faulty signal equipment, faulty mirrors, and over-lubrication were involved. From the cases which we have had during the year, several typical cases have been selected to show the variety of defects in vehicles which led to accidents.

A Case of Inadequate Brakes:—A truck proceeding west on a Manhattan crosstown street at about 18 or 20 miles per hour, to avoid a collision with another vehicle, ran over the north curb with all four wheels on the sidewalk. The driver stated to one of the detectives that as the truck jumped the curb he saw a child on roller skates playing in front of him, a distance of fifty feet (actual measurement). Driver also stated that he applied both his hand and foot brake with all his strength but was unable to bring truck to a full stop until it went about thirty feet after it had struck the child.

Result of Test of Vehicle: The emergency brake when applied could not stop the truck until it travelled a distance of 137 feet. The foot brake in not less than 87 feet. Both tests were made from a rate of speed of 20 miles per hour.

Result of Expert's Test and Examination: — Emergency brake found coated with grease (saturated), which apparently came from the universal and transmission. Foot brake had lining worn and grease had been thrown from the chains to the brake drum.

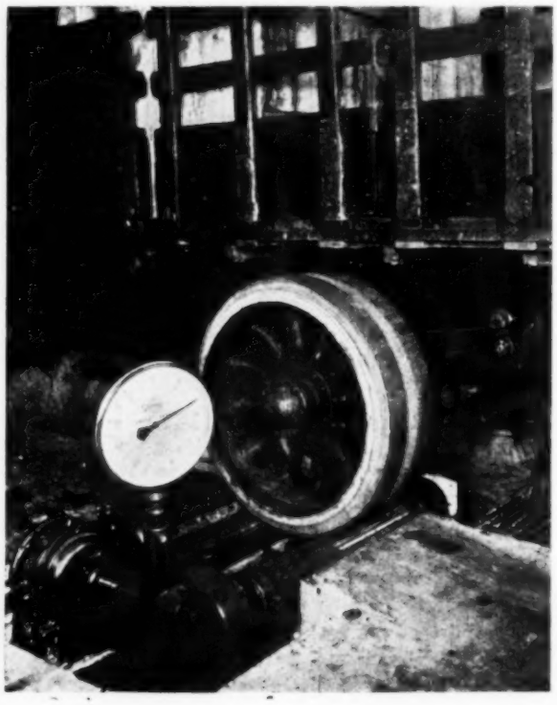
Another Case of Bad Brakes:—A passenger car travelling south on a Manhattan street struck and killed a woman. The driver stated that he saw the woman crossing the street but that he could not stop the car or avoid hitting her.

Result of Test of Vehicle:—Foot brake (four wheels) at 20 miles per hour stopped in 67 feet instead of twenty-two feet, and the emergency brake (two wheels) stopped it in 119 feet.

Result of Test and Examination:—Lack of adjustment on both brakes. Drums out of true. Clevis pin missing.

Brake Mechanism Out of Repair:—A truck proceeding south on an avenue at a speed of about 15 miles per hour. At a point about 76 feet south of the south curb of a street, a man was walking from the west to the east side of the avenue. The operator stated he first saw a man at a distance of about 20 feet in front of him; gave a warning signal, immediately applied both brakes, but could not bring truck to a stop due to heavy load of merchandise. The man was thrown to the pavement and was seriously injured.

Result of Test of Vehicle:—Truck examined; foot brake tested; truck went a distance of 140 feet before it was stopped. Emergency brake tested—truck went a distance of 197 feet. Both tests were made from a rate of speed of 15 miles per hour.



Result of Test and Examination:—Foot brake cams unable to expand brake lining against brake drum due to loose brake rod. Examination also showed that clutch and foot brake had no pedal rest. Emergency brake arm attached to brake rod was found to be broken, causing emergency brake to be ineffective. Further examination showed a quarter inch pipe two feet long attached to the emergency brake lever with the expectation of better leverage.

Mirror Inadequate: — A large truck was parked facing east on the north sides of a one-way street. An ice carrier on casters was on the right side of truck. The helper was in front of the carrier. A mail truck was backed in across the street. There was room for only one car to

(*Please turn to page* 40)

FACTS

on cold-weather operation

MANY operators have turned to Eveready Prestone to cut overhead as represented by nightly draining, overheating and freeze-ups. The following facts should be considered by every fleet owner before buying anti-freeze for 1932:

WASTE AND DAMAGE IN IDLING

Leading manufacturers of trucks have specifically warned owners against the false economy of idling engines in winter. It is pointed out that this practice wastes fuel costing more than anti-freeze; that excess crankcase dilution takes place and results in increased engine wear and oil consumption.

OPERATING TEMPERATURES

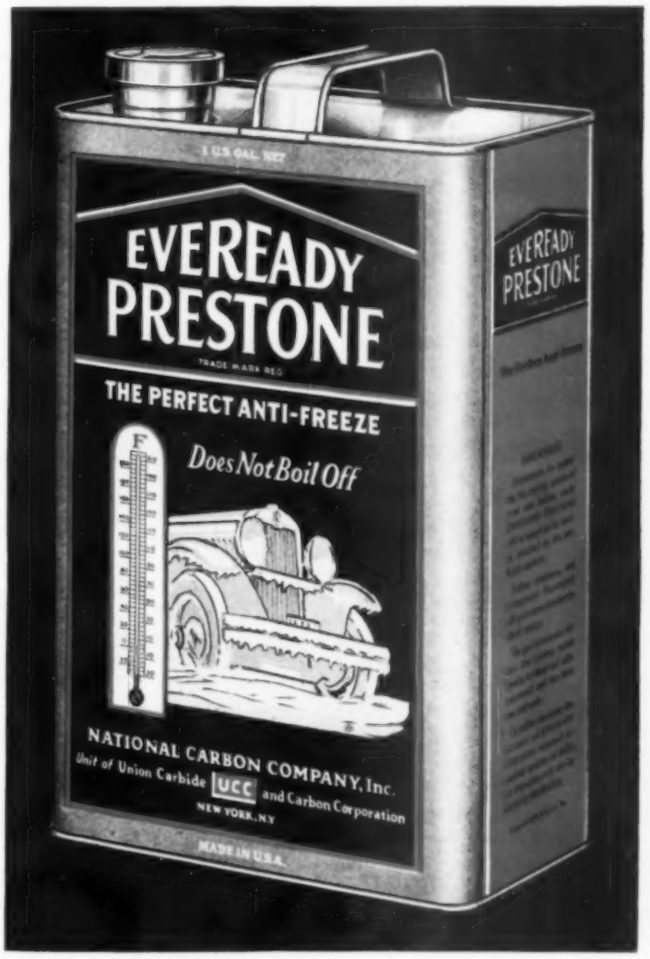
A truck designed to operate at 190° should maintain that temperature, summer and winter. The anti-freeze used should have a sufficiently high boiling point to permit this maximum motor-temperature at high speed or under heavy load. Eveready Prestone will not evaporate, and its high boiling point makes possible maximum power with the greatest gas mileage.

MAINTENANCE

Eveready Prestone is treated to prevent rust — reducing the corrosive action of water on iron 95%; on zinc, aluminum and radiator metals at least 75%. This exclusive treatment, protected by patents, prevents rust, clogging and overheating, and maintains cooling-systems in perfect condition. Eveready Prestone is also treated to prevent leakage and foaming. A cooling-system that will hold water will hold Eveready Prestone.

ECONOMY

Eveready Prestone is concentrated — not water diluted. Less of it is required per unit than any other anti-freeze on the market. It does not evaporate—no replacement costs! The price of Eveready Prestone has recently been substantially reduced. Eveready Prestone is now approved by all the principal passenger and commercial car manufacturers and by leading radiator makers.



Investigate Eveready Prestone *now* — and be safe for the season. Our trained personnel is at your disposal with information backed by experience in unusual applications.

NATIONAL CARBON COMPANY, INC.
General Offices: New York, N. Y.
Unit of Union Carbide UCC *and Carbon Corporation*

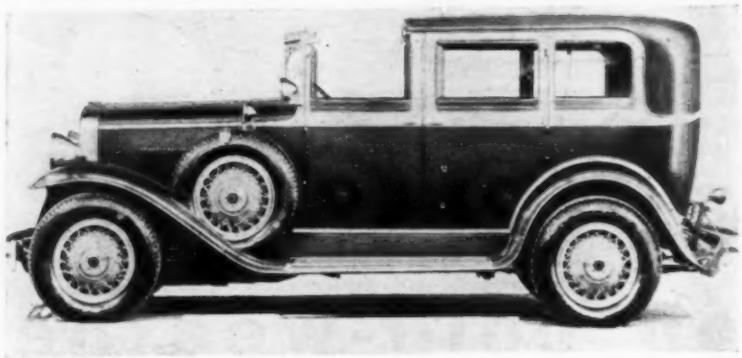
EVEREADY PRESTONE

Say "I saw it in FLEET OWNER"—It Helps!

Automotive Development and the Taxicab

By J. F. McMahon

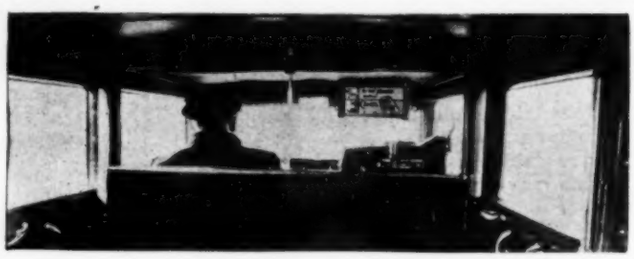
(Maintenance Engineer, Parmelee System)



PARMELEE SYSTEM has been operating vehicles since it placed horse-drawn buses on the streets of Chicago before the Civil War. It has passed through every stage of the development of the taxicab. It is not my purpose to give the taxicab industry an undue share of credit for modern automobile improvements, but it is possible to point out fourteen distinct and separate innovations developed to a large extent for the taxicab, but now used generally in all types of passenger cars.

Few people, outside of those intimately connected with the engineering side of taxicab operation, realize the outstanding achievements in the way of making the taxicab more convenient, comfortable and safe.

Constant operation of a taxicab automobile over city streets and through the stress and strain of traffic made necessary the solving of certain problems. In the solution of these problems all passenger cars have benefited.



One of the latest developments in the taxicab industry is the flashing advertising device operating off the battery and the engine vacuum.

Briefly, the story of the development of the taxicab is as follows:—

1. The first use of the steel disc wheel was used by taxicabs because it added an important safety factor; a wheel less liable to damage, lowering the cost of maintenance as compared with other types of wheels.

2. Taxicab manufacturers were the first to use balloon tires, only ten years ago, in order to provide easy riding over rough city streets with greater safety by reducing skidding.

3. One large unit has been experimenting successfully with non-puncturable inner tubes, having to date operated millions of miles without punctures. Who knows but we may in the future see cars operated without a spare tire or jack.

4. The continuous strain and shock of city traffic made necessary the non-metallic spring anchorage which has taken the place in taxicabs of the old ox-cart bolt and nut. Springs in many types of passenger cars are now connected with the chassis by rubber and fabric, thus eliminating vibration and requiring no lubrication. This one item alone has enabled the Parmelee System to operate at reduced cost.

5. Safety glass. Taxicabs were among the first to substitute heavy plate glass instead of window glass and later led in the use of non-shatterable glass not only in the windshield but in all windows of the cab.

6. Taxicabs were pioneers in heating and ventilation. Parmelee System cabs now use the re-circulating air type of heater, electrically driven, supplanting the old exhaust heating type, thus eliminating the problem of noxious fumes in the cab.

7. Percentage of accidents have been greatly reduced by the development of hydraulic four-wheel brakes now shared by many makes of private cars. Not only is the cab stopped quickly, but the brakes are kept constantly equalized, thus preventing skidding.

8. The taxicab industry developed the use of hypoid gears in rear axles to obtain lower center of gravity, thus preventing over-turn of cab in collision.

9. Taxicabs were first to develop a hinged type of rear side window to improve air circulation in the passenger compartment.

10. Pioneers in the use of alloy steel wherever parts are subjected to severe strain.

11. Due to the total number of passengers carried in any taxicab being largely in excess of the total carried during the life of any private car, cushions presented a special problem. The taxicab led in the development of specially tanned, soft, pliable leathers for cushions that combine wearing qualities with the necessary sanitary characteristics without loss of the warmth of mohair or velour.

12. Taxicab builders may reasonably claim to be the leaders in streamline construction, advanced styles in beauty and utility due to the necessity to attract business by modern and unique appearance.

13. Low cost of transportation has undoubtedly been brought about by reduction of upkeep such as making the cylinders of nickel-iron, which do not require any re-boring until after 100,000 miles; full floating wrist pins; oil control rings to reduce smoke and consumption of oil; separate bell housing and timing gear encasements, eliminating complete re-

(Please turn to page 50)

RENEWED OIL REDUCES MAINTENANCE

Writes A. J. Rody, Garage Supt.,
City of Detroit
Department of Water Supply

NOW—IF YOU HAD A SKINNER RECLAIMER on the job in your own garage, you too would be getting the daily benefits of dollars-and-cents savings resulting from greatly reduced maintenance costs made possible by Skinner renewed oil. Lower oil bills, all-round lower lubrication costs, less wear-and-tear on motors due to more frequent oil changes—these are the several definite ways in which Skinner equipment soon paid for itself in renewing and revitalizing formerly wasted drainage oil for the 106-car fleet of Detroit's Water Supply Department. Read their story based on two year's experience with Skinner renewed oil:

> "In April 1930 we installed one of your oil reclaimers. We are very well satisfied with both the machine and the reclaimed oil. This department has 106 cars which operate from three points known as the East, West and Central Garages. The drainage from the West and East Garages is brought into the Central Garage where it is reclaimed at a cost of 6c per gallon, including the filtering and electrical costs. Due to the little labor required in operating the machine, we do not make a charge for this item. Our general practice is to run from 100 to 150 gallons continuously after starting the machine. The fleet at the Central Garage, which is larger than either of the other two, operates entirely on reclaimed oil; new oil is used at the other two units.
>
> "In addition to the actual saving in the oil purchases, the installation of the Reclaimer has permitted this department to change the oil at more frequent intervals, which noticeably reduced our maintenance cost." *Signed* A. J. Rody, Garage Supt., City of Detroit, Dept. of Water Supply.

What Mr. Rody reports confirms what hundreds of other fleet owners have learned from everyday experience with their money-and-oil saving Skinner equipment. That renewed oil is as good as new oil is a definitely established fact. The letter you had just read is undeniable proof. Put a stop to daily waste of oil and hard earned cash in the operation of your own fleet by writing today for complete facts that will show you exactly what a Skinner Reclaimer can do in greatly reducing your lubrication and maintenance costs. There's no obligation!

FIVE MORE FLEET OWNERS TESTIFY to this undeniable fact which you cannot afford to ignore *that a Skinner is a most necessary piece of equipment for economical and efficient fleet operation.*

●

from Oklahoma

"Every fleet owner should have a Skinner Reclaimer"—writes G. C. Harrell, Pres.-Mgr., Yellow Cab Co., Oklahoma City.

from Pennsylvania

"Skinner Reclaimed Oil entirely satisfactory"—writes G.F. Callahan, Jr., Exhibitor's Service Co., Pittsburgh—who reclaimed over 2000 gallons of oil in six months. This company operates 85 trucks which in one year covered a total of 1,800,000 miles.

from Idaho

"No hesitation in recommending Reclaimer"—writes J. J. Turner, Manager, Service Station and Garage Co., Boise.

from Ohio

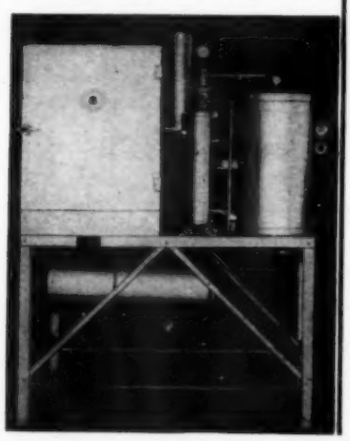
"Skinner Doing All You Claim for it"—writes J. M. Potter, Supt. of Equipment, The Akron Pure Milk Co., Akron—whose tests show that reclaimed oil goes slightly further than the original oil.

from Texarkana, U. S. A.

"Reclaimed oil at 7c per gallon as good as new oil"—writes Warren A. Taussig, Gen. Supt., Southwestern Trans. Co., who operate 175 busses and trucks.

●

These excerpts from dozens of letters in our files give you an idea of what Skinner Reclaimers are saving in hundreds of dollars and gallons of oil from these and dozens of other fleet owners. Similar savings can be made for you. Let us prove it. Skinner Reclaimers are priced as low as $290. Mail the coupon today and get the facts and figures on this machine which is cutting oil bills 40% to 60% for hundreds of prominent owners of all types of fleets.



Clip and Mail Today **WITH YOUR BUSINESS LETTERHEAD**

SKINNER MOTORS, INC., Pioneers in Oil Reclamation,
2229 Dalzelle at 14th St., Detroit, Mich.

Please send us, without obligation, complete information about Skinner Oil Reclaimers. Also tell us definitely with facts and dollar-and-cents figures what a Skinner Reclaimer will save us in cash and oil.

We purchase approx. ..... gallons of oil per month.
We drain approx. ..... gallons of oil per month.
We pay ..... per gallon of oil.
Our electric current rate is ..... c per kilowatt hour.

Signed ..... Position ..... 10—32

SKINNER OIL RECLAIMERS

MADE BY SKINNER MOTORS, INC., PIONEERS IN OIL RECLAMATION, 2229 DALZELLE AT 14th STREET, DETROIT, MICHIGAN

Say "I saw it in FLEET OWNER"—It Helps!

Cooling System Engineer Points Out the Disastrous Effect of Running Motors Idle During Winter Months to Eliminate the Use of Anti-Freeze

Idling Motors or Anti-Freeze?

By Wm. H. Wilson

IN considering winter fleet maintenance, we naturally consider mostly the engine and the cooling system, since anti-freeze and oil are matters of growing importance. A startling result of research investigation is reflected in the growing number of specific warnings from truck and bus manufacturers, to operators, *not to idle motors in winter.*

The practice of idling motors has been in vogue among truck and bus operators for years. It began, doubtlessly, because truck and bus motors required effort to start them; it should be ended now because trucks and buses start easier, many being equipped with self-starters, and because of cost, last but not least.

It is bad practice to drain off a gallon or two of the cooling water and then add anti-freeze. A check-up and cleaning should be done first.

The gasoline consumed in idling motors costs much more to the fleet operator than would anti-freeze. The U. S. Bureau of Standards is authority for the statement that "*crankcase dilution jumps from between 5 and 20 per cent in the summer to from 20 to 50 per cent in the winter, when motor idling is common practice.*" Of course, crankcase oil dilution results in oil viscosity change, through the thinning tendency of the adulterating gasoline.

On Page 7 of the Bureau of Standards Bulletin LC-320, title, "Automobile Engine Lubricating Oils," is the following paragraph on the effect of crankcase dilution on the engine, resulting from loss of viscosity in the oil when cylinder walls and crankcase are cold and unburned gasoline reaches the crankcase:

"*As a result of the loss in viscosity, diluted oil works past the pistons more readily, causing increased oil consumption, excessive carbon formation and fouling of the spark plugs. As these diluted oils will not maintain a lubricating film under as high bearing pressure as will the oil of higher viscosity, excessive wear and even seizure of bearings may ensue.*"

The Bureau's Circular states that "*in general, the amount of this dilution is governed by the engine temperature. When the cylinder walls and crankcase are cold, especially when starting, the amount of fuel reaching the crankcase is relatively high. This is shown as a fact that dilution in summer has been found to vary between 5 and 20 per cent on the average, whereas the amount increases during the winter to from 20 to 50 per cent.*"

And here is Bill Wilson, who has made a life-time study of cooling systems and passes his observations on to you this month.

On the next page of the same letter will be found another warning that touches on the practice of idling motors:

"*Still a third contaminant, particularly in cold weather, is the water which is formed in the combustion of gasoline in the proportion of about one gallon of water for each gallon of gasoline burned. The greater part of this water passes out through the exhaust gases in the form of vapor, but some vapor may blow by the pistons into the crankcase. In cold weather this will condense and may form emulsions with the oil, which have the appearance and consistency of heavy greases, or it may collect and freeze in such parts of the lubricating system as will prevent circulation of the oil. Water may also cause serious corrosion, particularly in combination with the oxides of sulphur from the combustion chambers to form corrosive acids.*"

At first glance it might seem from these references that engine idling is a beneficient practice, inasmuch as it maintains a certain temperature in the motor, which, by preventing the metals from becoming ice cold, it helps to prevent dilution, but this is not so. Engines idle at sub-normal temperatures and this is particularly true of truck and bus motors which idle at low speeds over quite protracted periods in many types of service.

Furthermore, when an engine is stopped after a run, the metals hold a fairly high temperature for several hours, or considerably longer than any average stop during the working day, so there is nothing gained by idling motors in even this respect. Of course, the operating temperature of the engine depends a very great deal on the condition of the cooling system and on the type of anti-freeze being used, if any.

If the cooling system is dirty and rust-clogged, overheating troubles will naturally be experienced, grow-

(*Please turn to page* 40)

EVEN A FAT SPARK

IS SELDOM AN ACCURATE TEST

Shop tests are fine for most of your equipment. But even actual road conditions are not always the final test for ignition cable.

Fleet owners know that the best answer lies in their maintenance cost sheets. That's why Packard cable stands where it does today with operators, engineers, mechanics and truck and bus manufacturers.

347B is the Super-Duty Cable with multiple resistance specially designed to resist grueling service. You can prevent high cost and premature ignition failure by replacing with Packard 347B.

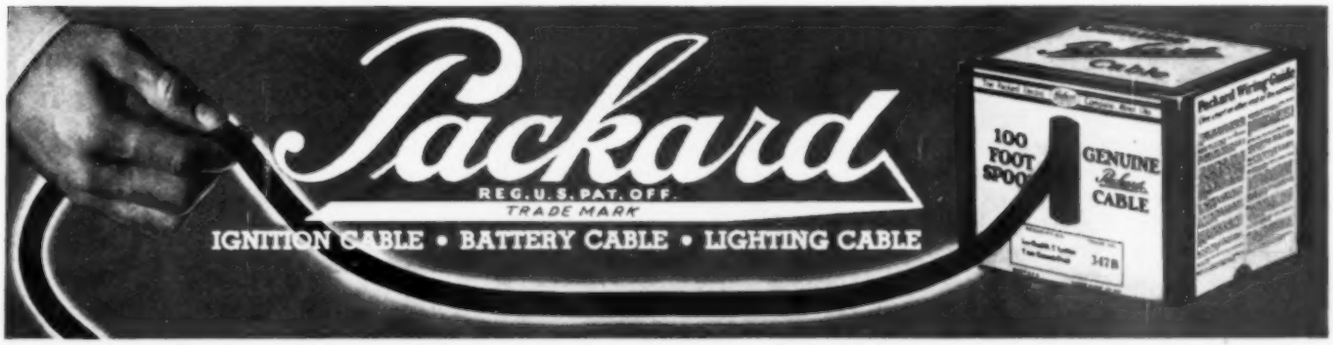
PACKARD ELECTRIC CORPORATION, WARREN, OHIO

Tri-ply Protective Sheathing

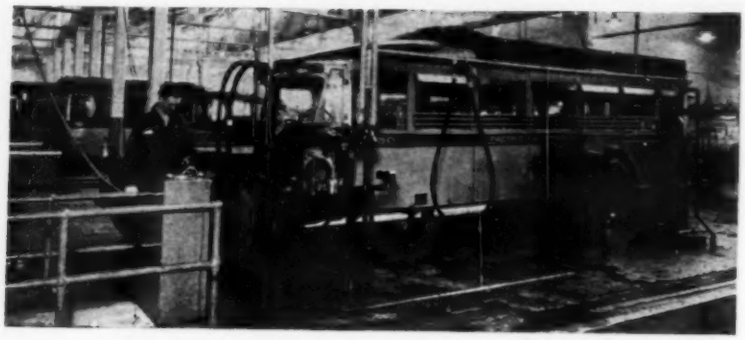
1. Lacquered cotton braid
2. Varnished cambric tape
3. Strong braid, multiple "Lackard "processed

LIVE WIRES

Have you seen the new all-talkie sensation "Live Wires"? Don't miss it. Put on by an all-star professional cast. Humor. Drama. And a moral that clearly points the way to safer, surer operation and lower maintenance costs. Ask your jobber when it's to be shown in your locality or write us direct.



By Paul Williams



Factors Affecting Fleet Lubrication

Timely Advice on How to Select the Proper Lubricants and How to Make Your Lubrication Dollar Go Farthest—The Best is Cheapest

ENGINE lubrication has become one of the most unsatisfactory and indefinite problems to the majority of fleet operators. They hear a great deal regarding the advantages of one oil over another, of the better specifications of one company's oil versus another's, of the superiority of a Pennsylvania oil or a Western oil, etc. However, after all the discussion, how many fleet operators have a clearer and more concise answer to their fleet lubrication problem? Few, indeed, if any.

The leading oil companies have quite a complete set of laboratory tests for lubricants and they naturally compare the quality of their oils with their competitors' products, on the basis of such tests. These tests include the well-known viscosity, pour, flash, fire, acidity, color, carbon-content tests, etc. Results of these tests are then given to the fleet operators and more than one operator has made the flat statement that he knows nothing about what they mean.

He knows, however, that the oils being purchased are keeping his fleet going and as long as they do this satisfactorily, he will continue to insist upon those same definite specifications. The fleet operator is right to a considerable extent, but has he fully answered the following:

"Is my fleet upkeep and waste hours, due to tie-up in repairing, reduced to a minimum?"

"Should I purchase a better lubricant, or am I paying too much for my oil to give me the best possible lubrication for my particular needs?"

Now for a few of the variables that enter into the type of lubricant which a fleet operator should use:

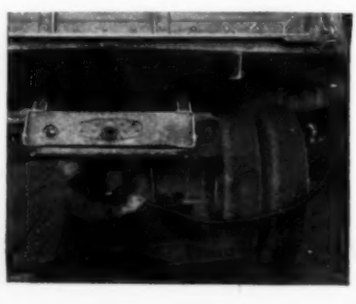
(a) Are the engines in your fleet all of the same general type and size?

(b) Is the operation practically uniform on all of the vehicles?

(c) Do summer and winter conditions enter into the situation?

(d) Are a number of the vehicles new, and a number of them in their last mileage?

(e) Are you using oils of high viscosity in order to cut down on the consumption of oil per vehicle mile, which is actually working out to be a false economy? (As your engines will not be properly lubricated, considerably more will be lost in maintenance costs than will be gained in reduced oil expense.)



With these variables and other changing conditions, including particularly the manner in which the individual vehicles are driven, it is most difficult for a fleet operator to know even where to start in judging his lubrication.

The following manner of analyzing the situation is probably the most simple and normally brings the most profitable results with the least danger of erring in your engine lubrication.

First: Get in touch with those oil companies who make or market high-grade lubricants.

Second: Decide upon two or three of these companies in which you have the most confidence.

Third: Place your lubrication problems before their engineers and have them recommend the best lubricating proposition for your fleet.

These engineers have the advantage of considerable experience with a large number of other fleets some of which no doubt had similar conditions to yours. After making a survey of your operation they will make direct recommendations. You, from your point of view, can determine which recommendation appears the most logical.

After deciding on which recommendation you plan to follow, have two or three of these companies bid on the desired lubricants. Place these lubricants into usage, keeping track of the oil mileage on a number of your vehicles, in order that you may obtain a fair average.

Also, for a short period of time, keep a record on several vehicles by taking a sample for analysis, of oil from the crankcase every 500 miles if you are running 1500 miles between oil changes. On these samples, have tests made for dilution, viscosity, and a tendency toward this oil's containing tarry matter. Thus you will have a real picture of how this particular lubricant is standing up in your fleet operation and the likelihood of its causing you any difficulty.

Lubricants which will withstand the above tests satisfactorily may cost a few cents more per gallon than the oil you are now using. Remember, however, that you now may be having additional maintenance upkeep due to poor lubrication. Accordingly, the oil that takes care of the requirements given above will prove for you the most economical lubricant.

(*Please turn to page* 40)

PLYMETL PANELED BODIES

Multiply Good Will—

Photograph by courtesy of General Motors Truck Corp.

These 34 PLYMETL Bodies Are 34 Business-Building Advertisements for Cashman Laundry

PLYMETL in *your* bodies means—

STRENGTH
APPEARANCE
LIGHT WEIGHT
ECONOMY
SATISFACTION

PLYWOOD
HASKELITE
PLYMETL

Specify PLYMETL on your next bodies—then note the results.

HASKELITE MANUFACTURING CORPORATION

120 S. LA SALLE STREET, CHICAGO, ILLINOIS.

New York Distributor,
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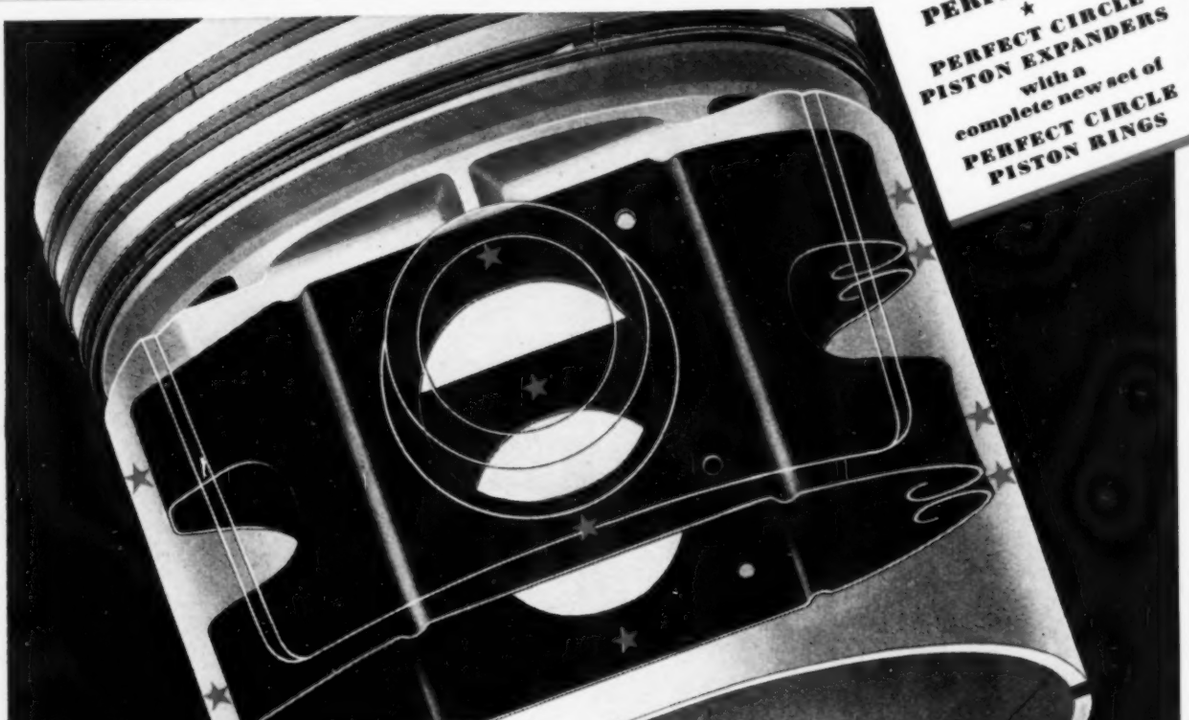
JACOB GERHAB, INC.

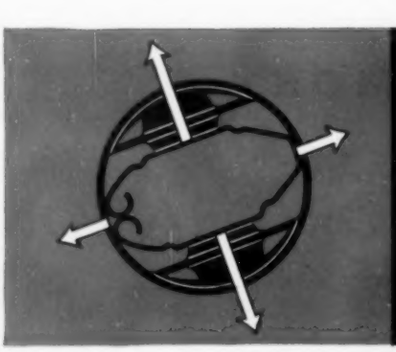
Revolu

THE PERFECT JOB
★
PERFECT CIRCLE PISTON EXPANDERS with a complete new set of PERFECT CIRCLE PISTON RINGS

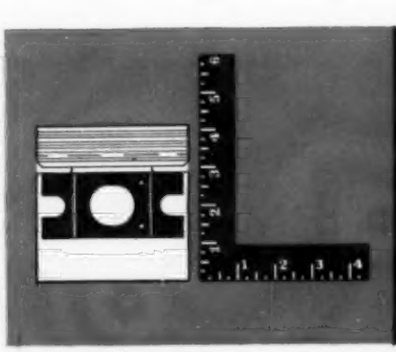


Correct Expansion attained by scientific application of pressure at **10** different points—indicated by the stars

PATENTS PENDING



CORRECT EXPANSION OVER ENTIRE SKIRT INSURES FULL CYLINDER CONTACT



CORRECT EXPANSION PREVENTS PISTON ROCKING AND "SKIRT-TAPER"

Say "I saw it in FLEET OWNER"—It Helps!

tionary

THE PERFECT CIRCLE *Piston Expander*

For Ford Model A

1 Correct Expansion Over Entire Piston Skirt

2 Piston Slap Eliminated **3** No Machining Necessary

4 Securely Locked in Place by Piston Pin

5 Unconditional Performance Guarantee

As EVERY good maintenance man knows, millions of cars and light commercial vehicles, equipped with split skirt aluminum pistons, are suffering from piston wear and piston collapse—the chief causes of *piston slap*. Such pistons rock in the cylinders—and not only cause a disagreeable knock, but unseat the rings and wear them oval on the face, causing excessive oil consumption and blow-by.

Realizing the basic cause of this trouble, PERFECT CIRCLE engineers have developed a method which for the first time gives a simple, dependable and proper cure for piston wear and collapse. The PERFECT CIRCLE *Piston Expander*—embodying an absolutely new principle—is the result of their research.

Through the use of the PERFECT CIRCLE *Piston Expander* the skirt is expanded sufficiently to compensate for wear and eliminate all slap—the piston fit is restored, the rings are held squarely on the cylinder wall, exceptional oil mileage achieved—and long, efficient service assured.

You make the installation yourself, simply slipping the expander into the piston, and locking it in place with the pin. New PERFECT CIRCLE rings should, of course, be installed at the same time to replace those which have been worn oval by piston rocking. The result is a first-class ring and piston job which can be completed in practically no more time than is required for a ring job alone.

To acquaint maintenance superintendents with the genuine merits of PERFECT CIRCLE *Piston Expanders* we are offering a Ford Model A set of expanders FREE with the purchase of a set of PERFECT CIRCLE "*85*" *Oil-Regulating* and *Compression* rings. Just fill out the attached coupon and take it to your PERFECT CIRCLE jobber. List price, 85c each, $3.40 per set of four.

UNCONDITIONAL PERFORMANCE GUARANTEE

PERFECT CIRCLE *Piston Expanders* are unconditionally guaranteed by the manufacturer to stop piston slap and give satisfactory performance (regardless of amount of cylinder wear or piston condition) when installed in conjunction with a *complete new set* of PERFECT CIRCLE "*85*" *Oil-Regulating* and *Compression* rings. If for any reason the car owner is dissatisfied, installing dealer is authorized to return expanders and rings to a PERFECT CIRCLE jobber for replacement or credit.

THE PERFECT CIRCLE COMPANY, *Hagerstown, Indiana*

© 1932

Clip This Coupon and Present to Your PERFECT CIRCLE Jobber

This certifies that I have purchased one complete set of PERFECT CIRCLE "*85*" *Oil-Regulating* and *Compression* rings for Model A Ford, and have received FREE one set of four PERFECT CIRCLE *Piston Expanders*. F.O.

NAME OF COMPANY.....

ADDRESS.....

SIGNED BY..... MAINTENANCE SUPERINTENDENT

JOBBER..... CITY.....

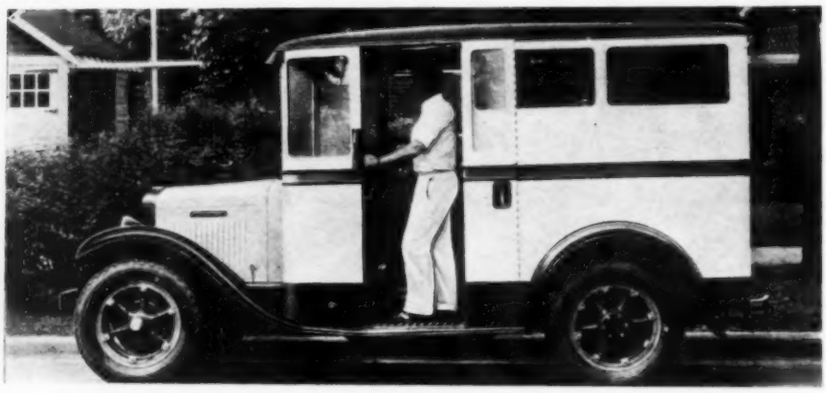
(This offer is limited to one set of expanders to each service shop and expires Dec. 1, 1932.)

GET YOUR FREE SET

Say "I saw it in FLEET OWNER"—It Helps!

DOOR-TO-DOOR UNIT BY INTERNATIONAL

INTERNATIONAL Harvester announces its new Model M-2 motor truck, designed especially for door-to-door or house-to-house delivery service. In addition to the complete milk delivery unit with body, which is shown in the accompanying illustration, the M-2 chassis is available for those operators requiring special types of bodies.



While many units and parts of the International Model M-2 are interchangeable with other International chasses, it is not a rebuilt or modified conventional truck, we understand. The frame side rails are specially fabricated in one piece, eliminating all splicing.

One of the features of the M-2 is the four-cylinder L-head type engine (bore 3⅝", stroke 4½") developing 39 h.p. at 2400 r.p.m. The fuel and oil economy of this engine is claimed to be unusual. The generator, of the low-speed, high-charging type, will keep the battery charged under all normal door-to-door delivery conditions.

The double-disc clutch, an important factor in house-to-house service, has a vacuum control, providing completely automatic clutch operation. The driver's left foot is free and the clutch may be forgotten under ordinary driving conditions. This provides smooth clutch engagement and prolongs clutch life. However, the clutch pedal and conventional hook-up are still retained, and the operation becomes of the conventional type immediately upon pulling out the control button from the dash.

The transmission is of the selective sliding-gear type with four forward speeds and one reverse. It is mounted in unit with the engine and the assembly is carried in a three-point mounting with rubber cushion rear supports.

The rear axle is of the full-floating spiral-bevel gear-drive type. The axle reduction is 6.166 to 1. Drive shafts are of chrome-molybdenum steel, and the pinion differential and axle shafts are mounted in tapered roller bearings.

Service brakes are of the four-wheel mechanical type, operated by a pedal which is fitted with a hinge-mounted ratchet on its right-hand side. For ordinary deceleration the driver's foot on the pedal does not overlap the ratchet but for a parking stop the pedal and ratchet are depressed. This permits the ratchet to lock at the depressed position of the pedal, thus serving effectively as a parking brake. The propeller-shaft hand brake provides an emergency brake.

The rear springs of the Model M-2 are of the two-stage type with semi-elliptic main springs 2½ inches by 46 inches, which provide easy riding qualities and capacity for rated loads. Auxiliary semi-elliptic rear springs, 2½ inches by 33 inches, provide additional capacity for the hauling of maximum

(*Please turn to page* 30)

DODGE-LUCE-HASKELITE BUILT 'EM

ILLUSTRATED here is one of a fleet of approximately 150 units, the bodies of which were built for the Ward Baking Company, by the Luce Manufacturing Company of Lansing, Mich.

The body on the vehicle pictured has an 8½ foot loading space and is of dust-proof construction throughout. It is paneled entirely with Plymetl.

The rear door construction is an exclusive feature with all Luce Manufacturing Company's "Mastercraft" bakery bodies. The floor construction is water-proof and dust-proof, as well as fume-proof.

These features are achieved by the use of a tongued-and-grooved hardwood floor laid over a subfloor, between which is a heavy coating of water-proof paint. The unit illustrated is mounted on a Dodge Brothers truck chassis.

Further details regarding this interesting type of specialized body may be had by corresponding directly with The Luce Manufacturing Company, Lansing, Michigan, or the Haskelite Manufacturing Corporation, 120 S. La Salle Street, Chicago, Ill. The latter Corporation supplied the Plymetl paneling.

"IT IS PREDICTED . . . THAT, IF A DEVICE can be developed which will control the ignition in accordance with load as well as engine speed, engines will have longer life and smoother performance with greater gasoline economy."

"THE ONLY DISTRIBUTOR THAT TIMES AN ENGINE IN ACCORDANCE WITH BOTH LOAD AND SPEED"

The foregoing statement was made before a meeting of automotive engineers about six years ago by one of the leading ignition engineers. It presented a real problem; one that has taken years of research and development, but it has been solved by Mallory, who now gives the automobile trade the **only distributor that times an engine in accordance with both load and speed.**

Now, Mr. Fleet Owner, we must repeat that if you were told that all of your engines were running *out of time,* you would not believe it. Nevertheless, *it is true,* and if you want to prove it, put on a MALLORY MODEL K SPEED-LOAD CONTROLLED DISTRIBUTOR.

If this distributor increases the mileage, eliminates spark knocks, which everyone knows batter engines to pieces, you will then be convinced that the statement, "The engine is running out of time." is true.

This new distributor, which is the solution for properly timed ignition, will, in the gasoline it saves, *actually pay for itself* in a short time— and every fleet operator wants to save fuel. In addition to this, *the life of the engine will be increased* mechanically. No engine will stand up when "spark knocking" at low speeds and on sudden acceleration, as almost all buses and trucks do.

WHY NOT ORDER ONE OF THESE NEW MALLORY DISTRIBUTORS FROM YOUR NEAREST MALLORY JOBBER OR SERVICE STATION AND GIVE IT A THOROUGH TRIAL? **If it doesn't do as we say, you haven't bought a thing.**

Every fleet owner, service manager and mechanic should read our Bulletin 160. Write for it.

MALLORY ELECTRIC CORPORATION

MALLORY TRADE MARK

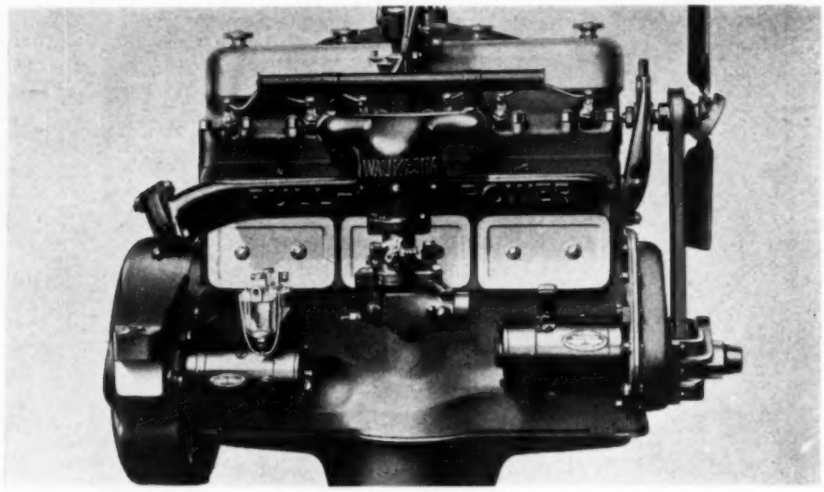
DETROIT, MICH., U. S. A.

Say "I saw it in FLEET OWNER"—It Helps!

WAUKESHA OFFERS "FULL-POWER" ENGINES

THE Waukesha Motor Company, Waukesha, Wis., has recently introduced a new line of six-cylinder engines for motor trucks, motor coaches, pumping, electrical and general industrial machinery. These engines are known as the "Full-Power" series and are being manufactured in three sizes, as follows: 6-90-255, 6-110-358 and 6-125-462, the first figure meaning the number of cylinders, the second the horsepower and the third the cubic-inch piston displacement. Ultimately the line will be complete for every service in which Waukesha engines are now used, and for which their standard, Ricardo-Head engines are built.

The three models are similar in design and appearance and are stated to be the product of eight years' research in both combustion chamber design and metallurgy. They are introduced as being H. L. Horning's interpretation of the basic principles of combustion chamber design carried to their ultimate, logical development. The claim is made that these engines will deliver 25 to 30 per cent more horsepower than conventional engines of the same size.



Aside from distinguishing metallurgical advances, such as the use of special Waukesha alloys in crankcase, cylinder block and manifolds, the type of combustion chamber is of particular interest, the intake valves being located in the cylinder head, directly above the piston, while the exhaust valves are placed at the side, in the main cylinder block. The performance of this design is said to be chiefly through a further extension of basic Waukesha principles—controlled turbulence, compactness of combustion chamber, shortness of flame run and "deep breathing" ability—found in the "Full-Power" cylinder head.

The separation of the valves is said to permit the concentration of the compressed charge into a space favorable to complete combustion, to make for ideal spark plug location, to make possible the use of bigger valves, to provide more water jacketing around the valve seats and to simplify the intake and exhaust manifolding, especially when down-draft carburetors are used.

Bore and stroke of the three engines are, respectively: 3⅜ x 4¾ inches; 4 x 4¾ inches; and 4⅜ x 5⅛ inches. Crankshafts are of heat-treated S. A. E. 1045 steel, statically and dynamically balanced. Four main bearings are used on the 6-90-255 and seven mains on the two larger engines. Crankshaft diameters are 2⅝, 2-13/16 and 3-inches, respectively. Pistons are of aluminum alloy, cast without struts or inserts, with thick head tied by heavy ribs to the pin bosses and to the thick split-skirt. Pins are full floating, having aluminum plugs at each end. Steel-backed babbitt is used in both main and connecting-rod bearings.

Lubrication of "Full-Power" engines is of the full-pressure type, having positive gear-type pump submerged in the lower crankcase oil pump. Oil is delivered through passages, through a series filter and built-in oil-cooler to each main, camshaft, connecting-rod, piston pin, rocker arm and water pump drive bearing, and to idler gear stud and gears. Valve mechanism and cylinder walls are bathed in continuous oil mist. A vertical oil screen and patented oil level equalizer are used. Pressure regulation can be done from outside, while engine is running.

High-capacity water pump delivers water throughout cylinder block and head, around valve seats and around the full length of combustion chambers. Fan is supported on adjustable bracket and is driven by a v-belt.

Valves, the location of which has been previously mentioned, are of chrome-nickel steel for the intakes and Silcrome steel for the exhausts; dual valve springs are used. Rocker arms for the intake valves are pressure oiled and fully enclosed. Tappets are of the mushroom type in demountable guides bolted to the crankcase. Camshaft, with all cams integral, is driven by wide-faced, helical-cut timing gears of mild steel and special Waukesha alloy.

Flywheel housings are demountable, so that other sizes than standard can be applied. Provision is made for simple installation of all standard accessories: air cleaners, fuel pumps, oil filters, oil coolers, battery or magneto ignition, motometers, thermostats, electric generators and starters, air brake compressors, etc.

Interesting literature, with blueprint dimensions, covering the new "Full-Power" engines is now ready and will be sent without obligation on request to Waukesha Motor Co., Waukesha, Wis. You'll mention FLEET OWNER, won't you?

Door-to-Door Unit

(*Continued from page 28*)

loads and also act as stabilizers when negotiating short turns.

Short turning radius and cam-and-lever steering are featured. Ability to turn sharply is an essential in a truck of this type as it speeds up deliveries. This makes possible longer routes with more stops. The turning radius (with fender and body clearance) of the Model M-2 is 22 feet to the left and 21 feet 3 inches to the right.

Standard chassis equipment includes 6.50-20 balloon tires front and rear, cowl and dash, front fenders, front and rear bumpers, and complete electrical equipment.

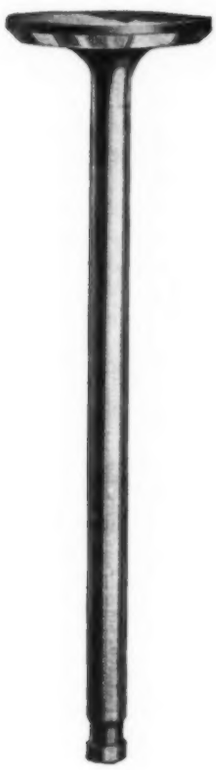
The 42-case milk delivery body, manufactured by International Harvester for this chassis, is of composite construction, providing ample strength to assure long life.

GOOD *for you*

*GUARANTEE

Toledo "Type S" Super-Forged Valves are guaranteed. Your jobber will give you, without charge of any kind, a new valve in exchange for any Toledo "Type S" Super-Forged Valve which proves defective in service.

because



. . . you can confidently depend upon Toledo "Super-Forged", *The Guaranteed* Valves. Hundreds of fleet owners have found that the best way to prevent valve trouble is to equip their fleets with Toledo Valves. If you don't use Toledo Valves now, install a full set on the next valve job and keep a careful performance record. You'll see why we guarantee them.

TOLEDO

Toledo Valves are standard equipment on the following: Auburn, Franklin, Reo, Hupmobile, Graham, DeVaux Six, Stutz, Durant, Mathis, Federal Trucks, Continental Motors, Buda Motors, Lycoming Motors, Sterling Motors, Van Blerck Motors, Leroi Motors, Advance-Rumely Tractors, Allis-Chalmers Tractors, Massey-Harris Tractors, J. I. Case Tractors.

The Toledo Steel Products Company, Toledo, Ohio, U. S. A. » New York, 17 W. 60th Street » Chicago, 1225 So. Wabash Avenue » Atlanta, 279 Ivy Street, N. E. » Dallas, 2805 Commerce Street » Kansas City, 14th and Oak Streets » Los Angeles, 1341 South Hope St. » San Francisco, 528 Larkin St.

Say "I saw it in FLEET OWNER"—It Helps!

QUESTION *of the* MONTH

"By far, one of the most valuable departments to be found in any automotive publication. Every fleet man should be delighted to cooperate."—A Reader

What Our Survey on Glass Replacements (No. 23) Revealed:

BECAUSE of the growing interest in safety glass and the very apparent need for this safety feature, we published a questionnaire in the August issue of FLEET OWNER, to determine the attitude of our readers on this subject.

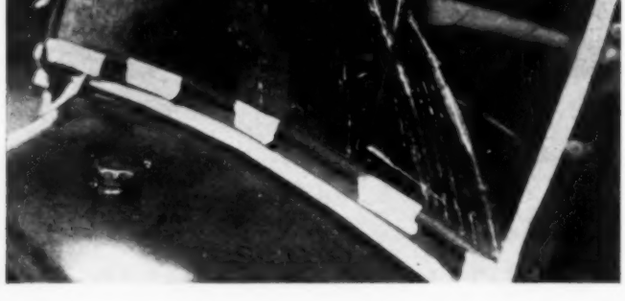
The answers we received were most interesting because they showed that a large percentage of fleet operators were unqualifiedly in favor of it and practically all of the others would use safety glass if certain faults were corrected. A few of the most interesting replies are published in our Question-of-the-Month Department on the opposite page.

Present-day conditions where every year thousands of people are killed and hundreds of thousands are injured by automobiles, causes every thinking person to pause and study this condition, which has grown upon us.

From a humanitarian standpoint, the suffering and loss is appalling—from a business standpoint, the cost in dollars and cents is incalculable. Safety glass, when its usage becomes universal, will undoubtedly lessen the toll taken daily by accidents. A survey of the answers received to our questionnaire showed a large percentage of fleet owners did not know that the safety glass of today resembled that of yesterday *in name only!*

Safety glass was first used in automobiles to any extent in 1928. The manufacturers are the first to admit that this glass was not perfect—but what new product is perfect when it is first brought out? The most common fault was separation, (showing as clouding around the edges), discoloration or yellowing, and cracking for no apparent reason.

Some safety glass which was extensively used was objectionable because of imperfect vision. This latter fault was not due to the fact that it was safety glass but was the result of using window glass instead of plate glass in order to keep the cost down. The error of this economy, except where clarity of vision and appearance could be sacrificed, was soon apparent.



Due to the somewhat general impression that the safety glass of today still has the faults common to it when first introduced, we wish to give our readers the results of our investigation of several of the best known makes:

Separation is the breaking down of the bond between the two pieces of glass and sheet of flexible plastic sandwiched between them. These three parts are welded together by the application of heat and pressure. Two main factors destroyed the permanency of this bond, namely the absorption of water around the edges and the improper application of pressure during the welding, which caused a strain to be set up within the glass.

By pressing the glass in a fluid instead of between metal platens, as was done formerly, the pressure is distributed equally on the edges of the glass, as well as on the top and bottom surfaces, thus eliminating all possibility of strain.

Another method of preventing separation is by the sealing of the edges. This is done by removing the plastic material to a depth of ⅛ inch and filling this space with a waterproof compound.

All safety glass now used in windshields is protected by this process and some of the glass used in the windows is also so treated. It is generally admitted that these two changes in the manufacture of safety glass, have entirely eliminated the problem of separation.

Discoloration, or yellowing, is caused by the action of ultra-violet rays on the center sheeting of plastic material. This trouble has been overcome by the use of a plastic which is less sensitive to these rays or by the use of a special glass which absorbs them before they reach the plastic sheeting. The best makes of safety glass can now be expected to last the life of the car without objectionable discoloration.

The cracking of safety glass for no apparent reason was confined almost entirely to the product made by a company which is no longer in business so this may be eliminated from the present consideration.

To sum up, we find that the faults so common in safety glass at its inception have now been entirely overcome. Its advantages in case of an accident can hardly be disputed and its additional cost over ordinary glass seems to be well justified.

(Editor's Note: If you have been thinking about safety glass lately, Mr. Operator, you might be interested in reading some literature that our Service Department is distributing to fleet operators, free of charge. This reading matter illustrates and describes safety glass from all angles, and gives all the information you might want on the subject. A note, on your letterhead, addressed to the Editor, will bring copies without obligation.)

A FEW of the SAFETY GLASS REPORTS:—

Eventually! Why Not Now?

"FORTY-ONE per cent of our fleet is equipped with safety-glass in the windshields. We do about 50 glass replacement jobs per year, and this work is done in our own shop. We have no special equipment for installing safety-glass.

"All glass is replaced with the same kind of glass that was originally used. Eventually safety-glass will be standard equipment in our fleet, but just now safety-glass is too expensive to use for ordinary replacement purposes. Safety to passengers in our buses is a big factor. We have about one accident per year in which injuries are caused by flying glass."—*Kansas City Public Service Co., Kansas City, Mo., R. W. Bailey, Engineer of Power and Equipment, operating a fleet of 34 trucks, 66 buses, 37 passenger cars and 6 miscellaneous vehicles.*

Question Not Yet Settled

"THE question of safety-glass in our fleet has not as yet been seriously considered. We grant that it is a valuable safety feature, but up to the present we have had to replace most of our safety-glass on account of discoloration or separation. It is always replaced with safety-glass.

"About 40 per cent of our fleet is equipped with safety-glass in the windshields. We do about 12 to 14 glass replacement jobs per year and plate glass is used for all jobs, except where safety is replaced with safety.

Possibly in the future safety-glass will be used throughout our fleet on account of the safety feature. We have only had one glass accident causing injury, in four years."—*G. E. Bickert, Foreman, Auto Dept., P. & R. Coal & Iron Co., Pottsville, Pa., operating a fleet of 20 trucks, 9 ambulances, 3 trailers, 76 passenger cars and 14 others.*

It's the Truck Makers' Move

"SAFETY-GLASS will be standard equipment in our fleet just as soon as the truck manufacturers put it in. There is not enough glass in our fleet of trucks to justify the use of safety-glass and our service is not such as to absolutely require it at the present time.

"Approximately 50 per cent of our fleet, however, has safety-glass in the windshields. Very few glass replacements are done per year and this work is farmed out. We use all types of glass for replacement work, replacing in kind. We can trace no accidents in which injuries were caused by flying glass."—*W. H. Douglass, Fleet Mgr., McEwen's Laundry, Nashville, Tenn., operating a fleet of 17 trucks and 5 passenger cars.*

General Trend Towards Safety

"A GENERAL tendency towards the use of safety-glass indicates that eventually our fleet might standardize on safety-glass throughout. At present 50 per cent of our vehicles have safety-glass windshields, while 1 per cent of our vehicles is safety-equipped all around.

"Our glass replacement work is divided. Some is done in our shop; some is farmed out. We use safety-glass for replacement in Ford windshields and plate glass for all others, although our present practice is to replace in kind."—*Howard A. Evans, Asst. Supt., Motor Transp., Phillips Petroleum Co., Bartlesville, Okla., operating a fleet of 613 trucks, 2 buses, 145 trailers, 716 passenger cars and 89 tractors.*

Prefers to Use Safety-Glass

"WHEN the car manufacturers use safety-glass throughout, we shall probably do likewise for replacement. At present only the Ford windshields in our fleet are safety-glass equipped.

"We farm out all glass replacement work and use plate glass for all replacement work, except where safety was original equipment, although we should prefer to use safety-glass."—*Sergeant W. H. Carr, Supt., Garage, Police Department, Kansas City, Kansas, operating a fleet of 10 passenger cars, 2 ambulances and 13 motorcycles.*

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York City)

Question No. 25—Engine Lubrication

How often do you change engine oil? ..... Miles; ..... Time Period.
What is your average mileage per gallon of oil? .....
About how many gallons of oil do you use per month? .....
Do you keep accurate records of oil consumption and costs? .....
Motor oil represents what percentage of your total maintenance costs? .....
What brand or brands of oil do you prefer? .....
How is motor oil purchased for your fleet? (See below) .....
On contract? ..... In open market? .....
From refiner? ..... From distributor? ..... From service station? .....
In bulk? ..... In barrels? ..... In sealed cans? .....
What has been your average price per gallon of oil this year? .....
Is your present oil satisfactory? ..... Reasons .....
.....
Is oil selected on a basis of first cost, or on performance and cost? .....
.....
How do you determine the relative merits of different brands of oil? .....
.....
What do you do with crankcase drainings? Reclaim? ..... Sell? ..... Discard? .....
If reclaimed, what machine is used and what is net cost of reclaiming? .....
.....
Remarks: .....
.....
How many vehicles in your fleet?
..... Trucks; ..... Busses; ..... Trailers; ..... Pass. Cars; ..... Others.

Note: If you cooperate with us and fill out this questionnaire, you will be entitled to a tabulated report covering all of the answers.

Swap your Lubrication experience with other fleet operators in this easy, convenient way. We do the work. You get the benefit.

Name of Firm .....
Address .....
City and State .....
Your name ..... *Position*.....

READER SAY-SO

(Picked at Random from The Editor's Mail-Bag)

Post Office OK's Us

"OUR copy of FLEET OWNER is delivered to our Chief Mechanic and passed on to the other mechanics and we all appreciate the many instructive articles in this splendid magazine. We operate a fleet of 153 trucks and maintain our own repair shop."—*R. P. Smith, Supt. of Motor Vehicle Service, U. S. Post Office Garage, Norfolk, Va.*

Try and Borrow It from Him

"OUR garage mechanic is very much interested in your Trouble Shooter's Department and has asked us to obtain from you the Wheel Alignment Chart mentioned in the August issue.

"For your information, I have never seen as much enthusiasm displayed for a magazine as Mr. Collins, our mechanic, shows for FLEET OWNER. Sometimes we just ask for a loan of this book and we see how often and consistently he will follow it up for return."—*U. G. Focke, Sec'y., The Wm. Focke's Sons Co., Dayton, Ohio.*

Our "Good Book" Interests

"I FIND your good book FLEET OWNER very interesting. Our fleet consists of 55 trucks and 10 passenger cars, used in delivering ice, coal and fuel oil. We operate our own repair shop."—*Isaac S. Wellington, Southern New England Ice Co., Bridgeport, Conn.*

"A Steady Improvement"

"AS a constant reader of FLEET OWNER, I notice a steady improvement in this magazine and I hope you will always reserve plenty of space in it for material touching the points of modern fleet maintenance. Wishing you success in every endeavor, I am—" *R. H. Fassett, Garage Superintendent, El Paso Laundry, El Paso, Texas.*

Short and Sweet

"YOUR magazine, FLEET OWNER, is highly interesting and it is looked forward to each month."—*H. P. McDonald, Supt. of Automotive Equipment, Missouri-Pacific Transportation Co., St. Louis, Mo.*

"O-Kay, Captain"

"WE note that our name has been placed on your controlled circulation list. Please accept our thanks and appreciation. We certainly enjoy reading this book, FLEET OWNER.

"A Motor Transport School is conducted at this depot at which we have in the neighborhood of thirty officers and fifty enlisted men, hence our original request to have FLEET OWNER sent to the depot."—*E. H. Besse, Captain, Q. M. Corps, Purchasing and Contracting Officer, Camp Holabird, Md.*

Thank You, Mr. Newton!

"I WAS very much interested in reading Mr. Middleworth's article on 'Self-Maintenance Vs. Farming Out' in the September issue of FLEET OWNER.

"The importance of self vs. outside maintenance will grow with the growth of this young industry. It is deserving of much thought and study and you are to be congratulated for bringing the matter before your readers."—*L. V. Newton, Byllesby Engineering & Management Corporation, Chicago, Ill.*

We Improve With Age

"THIS month's FLEET OWNER has some real good news. The new size is fine and it's improving with age."—*W. Vincent Kelley, Transportation Engineer, Harrison, N. Y.*

We've a New Friend

"I RECEIVED my first copy of FLEET OWNER today and find it contains some very interesting articles. We operate a fleet of 92 trucks and 61 passenger cars and maintain our own repair shop."—*C. A. Perdue, Manager Automobile Equipment, United Fuel Gas Company, Charleston, W. Va.*

Likes the Alignment Stuff

"SINCE the first issue I have read your FLEET OWNER with great interest. I have been particularly interested in the recent articles on front axle and wheel alignment and faulty steering, as I had experienced trouble with the steering in the past."—*M. E. Young, Washington, D. C.*

"Interesting, Instructive, Valuable"

"FLEET OWNER magazine is interesting and instructive, and is very valuable to us. We operate a fleet of 11 gasoline trucks and 2 passenger cars.—*J. R. Kirk, Kirk Lumber Company, Suffolk, Va.*

This Makes Us Blush

"I THINK the FLEET OWNER is the greatest magazine in the motor line that is published today. I have written to several of your advertisers and have had very prompt service."—*Arthur Goodwin, 59 Chambers St., Newburgh, N. Y.*

More from Moore

"I THINK you have made a mighty wise move and that you have done a splendid job in bringing out your publication in standard size and dressing up your book. It is attractively laid out, looks interesting and easy to read and seems to be a generally sound move." — *Hugh Moore, National Standard Parts Association, Detroit, Mich.*

Safety Among Drivers in Scattered Fleet

TO reduce automobile accidents through a sort of "remote control" is not the easiest nor the best way, but sometimes such a procedure is necessary and by proper handling it can be done most effectively.

The Pillsbury Flour Mills Company, with 450 salesmen-drivers operating from Portland, Maine to Portland, Ore., found itself confronted with quite a problem when it sought to reduce the ever-increasing number of accidents among its drivers. There was not much left to do except to start a sort of a "Correspondence School of Safety."

As a result, accidents have been cut from an average of 19 per month to 3 per month and the record is getting better constantly, C. V. Wells, Supervisor of Automotive Equipment of the Company, told the delegates at the recent Annual Safety Congress.

Drivers were given explicit instructions on car upkeep and a system of regular inspection was installed throughout the fleet. The responsibility for watching such items as loose brakes, faulty steering gear and defective lights was placed upon the drivers and at the first indication that anything was wrong they were required to have proper adjustments made. Also the matter of proper lubrication was called to their attention and they were asked to watch the tires carefully. These and many other mechanieal factors were emphasized.

In addition a constant campaign for safe driving was inaugurated and carried through pamphlets, bulletins, plant magazines, etc. The accident reductions started almost immediately after the campaign began and month-to-month improvement has been shown.

"You can readily see," said Mr. Wells, "that those features built into the car which enable the driver to see, to warn, to steer and to stop have been the primary subjects incorporated in our safety inspection work. We have been careful, in selecting our equipment, to choose that which is not strained or overtaxed by the specifications of the unit. We have insisted on periodic inspections by dealers, service stations or other semi-personal contacts at regular intervals and in addition have carried on a systematic educational program. Last but not least, we have developed a feeling of personal pride in our salesmen to keep their records clear."

Going to Be a Cold Winter?

LATEST reports from the headquarters of Old Man Winter have it that he is busy these days freezing a few million tons of snow and ice to deluge the country with this season.

If the U. S. Weather Bureau is right, you'll hear no robins chirping this winter, nor will you see your vehicles going through the greater part of the season without a care or a bother about freezing radiators and broken cylinder heads.

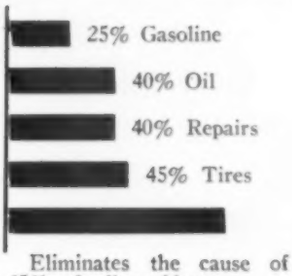
Nor is this prediction based on any of the old superstitions. Uncle Sam's forecaster has not been at the zoo feeling the thickness of the bear's coat, but instead has delved into the weather records of past years and has ordained that, unless his scientific weather eye is cockeyed, we'll have a rip-snorting winter—the kind the octogenerians like to reminisce about.

One of the reasons for the prediction is that we have experienced five consecutive mild winters, which in itself is a record. "Leaving out all other indications," says Mr. Weather Man, "the law of averages will assert itself." This, together with other indications, led recently to his official pronunciamento indicating that fleet operators had better be well stocked with anti-freeze and that it will do well to be an early bird and give your vehicles protection for the winter period.

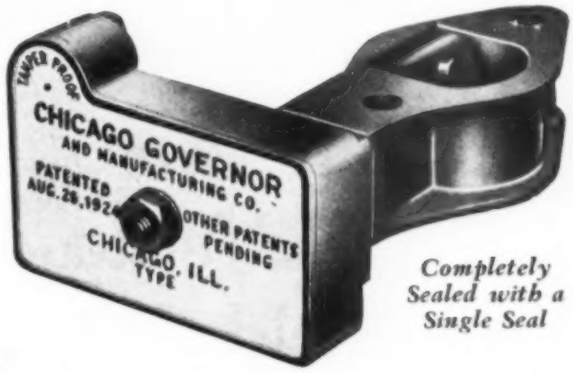
CHICAGO GOVERNORS

Save

for the average fleet . . . . . .



Eliminates the cause of 65% of all accidents.



Completely Sealed with a Single Seal

Settle that Governor Question Now

—Make a 30-day Test under your own everyday working conditions, at our expense

Settle this question once and for all, now, on one of your own cars or trucks. Determine for yourself just what governors can or cannot do for *your* fleet. If CHICAGO GOVERNORS can double your operating profit you want to know it. If they can't, here's your chance to find it out.

CHICAGO GOVERNORS are the latest and greatest achievement in governor development. They are accurate, efficient, tamper-proof and are Unconditionally Guaranteed to control both engine and travelling speed under all loads, *for the life of the engine.*

For Those Who Want Key Control

The LOCKSIT GOVERNOR (CHICAGO product) gives Key Control that is tamper-proof *in fact.* Set with a key, it is sealed with a seal wire that *passes through both lock and stud,* making it impossible to alter set, *even with a duplicate key or* lock-picking instrument.

LOWEST LIST PRICES

	1 inch	1¼ inch
CHICAGO	$12.50	$13.50
LOCKSIT	13.50	$14.50

Send in this coupon NOW

CHICAGO GOVERNOR & MFG. CO.,
505 South Laflin St., Chicago, U. S. A.

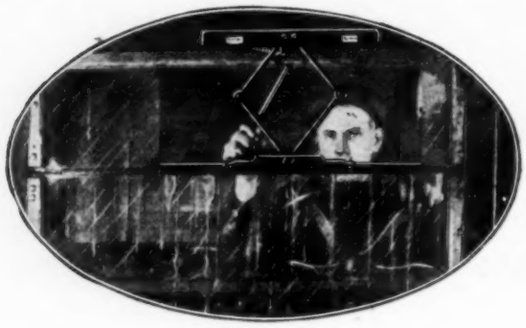
Gentlemen: Send a ☐ CHICAGO, ☐ LOCKSIT, Governor for 30 days Free Test on a ..... (Make of car or truck) ..... (Model and Year). It is understood that we are not obliged in any way to keep the governor.

Name .....

Firm .....

Address .....

My Jobber's Name .....



Your trucks need this CINCH *Vertical* Windshield Wiper

Right now . . . before the bad weather arrives . . . is the time to equip your trucks with windshield wipers. And only a *dependable* wiper will do . . . because your fleet must operate regardless of the weather.

It means *dollars* to you.

The Cinch *Vertical* Windshield Wiper has been proved dependable through actual use amid grueling, storming battles with the elements. Its *downward* stroke, an exclusive Cinch feature, is the only *practical* way to clean off rain, snow and sleet. Its operation is simple. Construction rugged. Installation easy. And price is amazingly economical.

Dairy and bakery truck-fleets, bus and transportation lines throughout America have used the Cinch Wiper for over 5 years with great satisfaction. Standard equipment on leading street railway lines!

Without obligation, let us send you prices and full particulars. Write *today!*

C I N C H
MANUFACTURING CORP.
2335 W. Van Buren St., Chicago

Stutz Acquires "Pak-Age-Car"

THE Stutz Motor Car Company announces that it has taken the necessary preliminary steps to enable it to enter into the manufacture and sale of the Pak-Age-Car, an automotive vehicle designed to compete with the horse-drawn delivery unit in economy of operation, convenience of stopping and starting, and in permitting quick entrance and exit of the operator.

The vehicle is designed to sell for approximately the same price as a horse, wagon and set of harness and to operate on a cheaper basis than the horse-drawn vehicle.

About sixty percent of the stock of the Package Car Company was owned by the Mechanical Manufacturing Company, one of the Swift interests in Chicago. Although approximately two million dollars have been spent in the development of this vehicle, the Swift interests have decided to sell to the Stutz Company the inventory, jigs, dies, fixtures, engineering data and other tangible assets that the various Swift interests own therein. The cars will be built in the Stutz factory at Indianapolis.

Detroit's Consolidated Delivery Experience

CHARLES E. BOYD, Secretary of the Retail Merchants' Association of Detroit, Michigan, recounted the experience of retailers of his city, in an address at a recent session of the Retail Delivery Association.

After recounting the steps which led to the adoption of the plan, Mr. Boyd stated: "Since the beginning of the operation, the special committee of the Retail Merchants' Association which originated this program, has had monthly meetings with the executives of Detroit Delivery, Inc., in order to iron out any difficulties. At the last meeting, however, it was found that the stores using the service had practically no complaints to make and up to date the whole plan has proven to be more satisfactory than was anticipated.

"Serious complaints coming to the delivery company from all of the stores combined do not average more than one a day. The executives of one of the largest stores using the service stated that for April the delivery company handled 110 more packages than the store itself handled during April, 1931, and at a saving of over $700 to the store.

"The executive of another of the larger stores said that they had secured definite savings each month since the operation had begun and had noticed a very material increase in their trade with the suburban territories where they are now having daily deliveries but where previously the store itself had not been able to render that type of service. Not a store which has turned over their delivery work to the contracting company had expressed a single regret over having done so.

"One of the interesting by-products of this entire activity had been that the several small consolidated delivery companies which were in operation previous to 1932 have reduced their rates to try to meet the competition offered by the rates as filed with the Public Utilities Commission by Detroit Delivery, Inc. This has meant that a number of firms are continuing to use the smaller companies for their delivery work but are enjoying rates which have been brought lower solely through the activities of the new company.

"When the delivery company took over the equipment of the individual stores a very large proportion of the delivery personnel was also carried over so that of the entire personnel of the delivery company at the present time, there is only one man who was not formerly connected with one of the local retail stores.

"On the whole, up to date, Detroit is very well satisfied with its present experience in consolidated delivery."

To Solve Trailer-Axle-Tire Troubles

INTERESTING facts relative to the causes of excessive tire wear on trailers have been revealed in a recent investigation by engineers of a leading axle company, which has shown that tires on trailers are subject to all the common causes of excessive tire wear that may develop on trucks; but that there is something beyond these common causes of excessive tire wear which is contributing to the irregular tread wear often observed on dual-tired trailers. These facts are of significant importance in view of the increase in this type of haulage operation.

Investigation showed that the troublesome tire wear condition was directly traceable to the deflection or bending of the trailer axle under load; the resulting inward tilt of the wheels throwing the weight on the inner edge of a single tire or on the inner tire of a dual mounting. The result, as stated by the Rubber Manufacturers Association, Inc., in their instructions covering the proper care of pneumatic truck tires, is "an unnatural wiping of the inside shoulders and leads to a breaking down of the fabric and premature failure." The proper remedy is obviously the reduction of axle deflection to a negligible minimum.

Tires are built to run in a perfectly vertical and parallel position when the trailer is loaded. Only under these conditions can the operator expect the greatest mileage from his tires.

It was found that positive camber (upward bend) or reverse camber (downward bend) both cause excessive tire wear, and that the proper solution lies in a tubular type member in which the necessity for camber in either direction is eliminated. Especially are these conditions troublesome when solid tires are changed for dual pneumatics on the existing axles, the increased track of the pneumatic tire permitting the axle to bend more readily.

Fleet operators should be interested in the findings of this investigation, disclosing conditions which are costing trailer operators so much in excessive tire wear and premature tire failure.

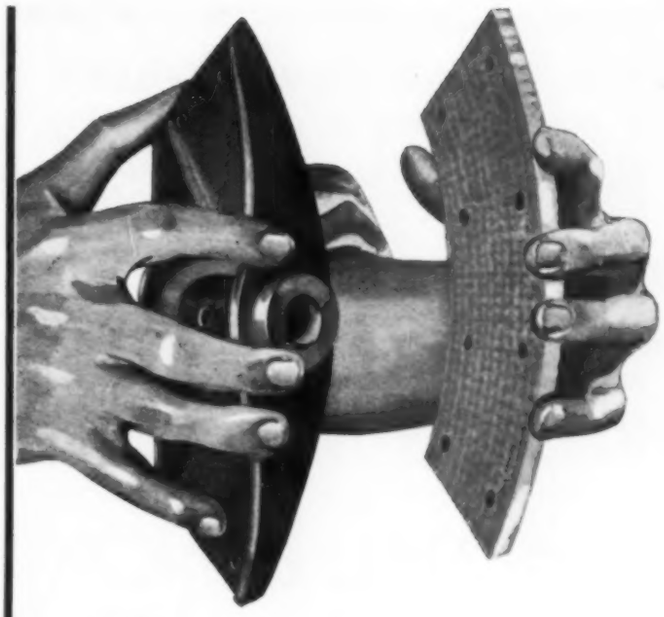
The Timken-Detroit Axle Company, Detroit, Mich., have compiled these findings in a booklet which is being offered without charge to those interested in the subject. They will be happy to receive your request.

"Private Street" Facilitates Loading

A PRIVATELY-OWNED street, cut through rock 42 feet below the ordinary street level, is an unusual feature of the Wanamaker Men's Store, Philadelphia, opened early in October as the largest store of its kind in the world. The street will be used for the loading and unloading of the store's delivery trucks. It's existence was made necessary by the congested traffic conditions at Broad and Chestnut Streets, where the new store is located.

A large van elevator with a capacity of 25,000 pounds will carry trucks to and from the ordinary street level to their underground destination. The underground street is 82 feet long and 56 feet wide. It provides room for ten trucks to load or unload at the same time. Additional underground space is occupied by the 20-foot wide loading platforms which surround the street.

The new store is housed on the lower eight floors of the recently completed 26-story Lincoln-Liberty Building. Provision has been made so that if it becomes desirable in the future, the van elevator can be run up to the floor above the street level, making it possible to load a truck at any floor and send it out of the building.



USE **GENUINE TRU-STOP LINING**

● **TRU-STOP BRAKE LINING is specially developed for use with TRU-STOP BRAKES. Ordinary wheel brake lining will not give the same satisfactory service.**

Adjusting the TRU-STOP BRAKE is a two-minute job. An occasional tightening of the take-up nut draws the shoes closer together. No equalizing is needed.

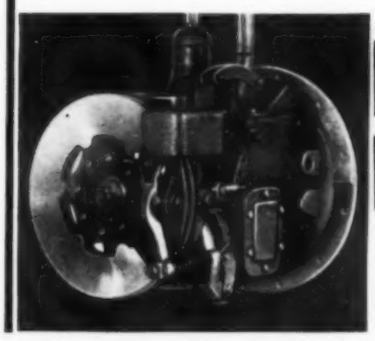
Replaceable shoes make relining TRU-STOP BRAKES easy. Any driver can do the job in twenty minutes. Anywhere. Anytime.

MORE THAN A PARKING BRAKE

● **The TRU-STOP EMERGENCY BRAKE is powerful, and capable of handling the entire load . . . on the level or down hill . . . at any speed. TRU-STOP meets requirements of all states.**

Demand more than a parking brake. Specify TRU-STOP EMERGENCY BRAKE. In the meantime, let us send you full particulars about the TRU-STOP EMERGENCY BRAKE. Write for folder and complete information. Address:

AMERICAN CABLE COMPANY, Inc.
AUTOMOTIVE DIVISION
BRIDGEPORT, CONNECTICUT
3-111 General Motors Building, Detroit, Michigan



TRU-STOP
A REAL EMERGENCY BRAKE

A Brand New Cushion
priced as low as a single repair!

The new-type Sponge-Aire truck cushion (Slip Cover Model) costs you no more than a single repair on that old cushion! And Sponge-Aire wears indefinitely—outlasts the truck. Made of 2-ply live sponge-rubber, covered with highly durable, double-thickness fabric. Absorbs vibration 100%. Adaptable to flat, solid bottom seat frames. Write for details.

SPONGE-AIRE
SEAT COMPANY, INC.
1433 MAIN ST. BUFFALO, N.Y.

HOTEL LENOX
New Lower Rates in Keeping with the Times

Single $2 to $3.50; Double $3 to $6; Family Suites $6 up.
Three minutes from Peace Bridge to Canada. 20 miles to Niagara Falls.
FREE. Excellent AAA road map and booklet. Write

CLARENCE A. MINER, President
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ARMORPLY
A SUPERIOR METAL FACED PLYWOOD PANEL FOR BODY CONSTRUCTION
Write for samples and prices
UNITED STATES PLYWOOD CO. INC.
603 W. 36th. ST. NEW YORK CITY

WE'LL GIVE YOU

Enough O'Brien's 2-Hour Enamel (any color) to finish a set of fenders to prove to you that it's the most satisfactory and economical finish made for fleet maintenance. Use the coupon.

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Gentlemen:
Send me enough O'Brien's Enamel to finish a set of fenders.

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You Can't Block Highways of Progress

An Editorial

By J. M. Cleary

(Studebaker Corporation of America)

DOWN an Indiana valley pioneer settlers built a toll road which put the primitive Indian canoes almost out of business and brought profit to the builders.

But their monopoly was not to endure, for other men soon built a barge canal parallel to the road. Notwithstanding frantic attempts to protect the rights of invested capital, much freight left the toll road and moved slowly and cheaply down the canal.

Soon, however, toll road and canal were fighting shoulder to shoulder against the encroachments of a competitor known as a "railroad." The railroad, with ruthless disregard of vested rights, prior possession of the field and stability of capital, proceeded to give the public such superior service that toll road and canal became obsolete.

But the railroad monopoly also was attacked. Parallel lines of steel appeared beneath copper wires. The railroad struggled desperately to strangle the new arrival with legislation, but the interurban prospered for it gave to some people quicker, cheaper, cleaner, and more convenient service.

And now the old post road, watered by millions of dollars of gasoline taxes, has burst into new life. Its forty feet of concrete make possible a flexibility and speed of transportation such as the world never enjoyed before.

So the railroad and the interurban are joined in a frantic effort to choke it, strangle it, handicap it with all manner of excessive taxes and restrictions.

Any attempt to make the stream of progress flow backward by legislative fiat is bound to fail. The public will not long permit any agency which renders them superior service to be crippled artificially and they will soon learn that legislation aimed at trucks boomerangs at themselves in the form of higher cost of practically all commodities and services.

Welding In Fabrication of Trailer Axles

ONE of the outstanding developments in motor transportation in the last year is the increasing use of trailers. The greater payloads and high road speeds demanded have necessitated definite improvements in economy and safety.

The Timken-Detroit Axle Company has introduced a line of brake-equipped trailer axles in a complete range of capacities to meet modern trailer operating conditions. In order to obtain the strongest axle beam to make it capable of withstanding the braking torque, and the most rigid beam which is necessary to insure maximum tire life, without increased axle weight, a tubular axle design was developed.

The tubular sections range in diameter from three and three-quarters inches to six inches, with wall thicknesses of one-half and nine-sixteenths of an inch, and the lengths vary between 60 and 94 inches. In order to obtain full advantages of the Timken design, modern developments in automatic electric welding were employed. Spring seats and brake flanges are welded to the tubular axle beam.

The Timken-Detroit Axle Company, after exhaustive tests, adopted the automatic arc welding process for the welding of the brake flanges and spring pads to the axle. The welding machine was furnished by the General Electric Company.

School's Open—Watch the Children!

IN a message to drivers of Parmelee System cabs, E. S. Higgins, Vice-President and General Manager of the company which operates fleets of cabs in New York, Chicago, Pittsburgh, Minneapolis and Cleveland, emphasizes the importance of extra care in the vicinity of schools reopening September 12th.

"Every year," says Mr. Higgins, "new ideas and precautions are adopted in an effort to insure the safety of children on their way to school. Even the best of these can never be quite as effective as an unremitting thoughtfulness exercised by each individual driver.

"Parents, teachers, school patrols and policemen have accomplished much in training the children to obey the laws and regulations that have been made for their protection," Mr. Higgins declares. "But," he adds, "once away from the immediate neighborhood of the schools, the majority of kiddies forget to be cautious. In their eagerness to play, they become thoughtless of danger and dash across unguarded streets without looking.

"Remember, it is the cab-driver who must do the thinking for the school child. Don't take it for granted that sounding a horn will stop a youngster from crossing the street when he sees his chum over the way. The chances are he will think he can "beat a motor vehicle to it" anytime and impishly run across.

"It behooves every driver to slow down the moment he sees children. If uncertain as to just what the youngsters will do, stop! Obedience to these simple methods," concludes Mr. Higgins, "will do more to curtail the motor driver accident record of the country than millions of dollars spent in other ways."

Beware of "Spontaneous Combustion"

SPONTANEOUS combustion is one of the most prolific causes of fires in this country. One of the most frequent causes of spontaneous ignition is the storing of oily rags in a confined space, without proper ventilation. This causes an oxidation process to start which quickly creates a high temperature, in many cases so high that a fire breaks out and gains disastrous headway before discovery.

It would seem a simple matter to persuade all fleet owners and operators of inflammable shops to see to it that there is never an accumulation, especially in confined spaces, of oily rags, cotton waste, burlap, paint cloths, oil and paint spotted overalls, wax and oil mops, or clothing and rags of all description. And yet the records show that this elementary precaution is constantly overlooked.

Telephone Man Tells All

"ABOUT 25 per cent of our brake work is done in our own shop, the balance being farmed out. Brake drum truing is all farmed out to outside shops. Moulded and semi-moulded lining is used on internal brakes; woven on the external brakes.

"We have not as yet found a brake lining that can be successfully used on all types of brakes. A combination of semi-moulded lining and cast drums gives us best results.

"Brake lining life is about 20,000 miles. Brake-drum life is about 40,000. We prefer semi-moulded lining for general use and specify it by make when ordering. We buy both from manufacturers and jobbers and use about 50 feet of brake lining per month."*F. M. Strasser, Supervisor of Supplies, Lincoln Tel. & Tel. Co., Lincoln, Nebr., operating a fleet of 40 trucks, 98 trailers and 122 passenger cars.*

Longer Tire Mileage

PECK

VALVE INSIDES

hold air pressure under severe road conditions because there is

LIVE RUBBER

(not moulded)

in the collar and seat.

Make a Peck Test!

Let us send you a few Peck Valve Insides—put them in a set of your tires—check the date and mileage. See for yourself how much longer they last.

THE PECK SPRING CO.
Plainville, Conn. U. S. A.

You Save Money

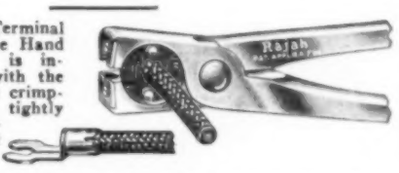
on rewiring jobs by using the new **Rajah** Hand Crimping **Tool**

This new tool crimps Rajah Terminals to ignition cable without the use of solder or any other tool. Note the simplicity of using it.

(Right) The cutter on end of Tool will remove just enough insulation.

(Left) Bend the exposed wire strands over end of Cable, then insert into ferrule of Terminal.

(Right) Now crimp Terminal to Cable by using the Hand Tool—The Terminal is inserted in the Tool with the ferrule flush with the crimping jaws—Compress tightly and you have a positive and permanent connection.



Tool with neat metal box containing 250 distributor terminals and 253 assorted spark plug terminals, $11.20. Tool alone $4.00.

THE RAJAH COMPANY, Bloomfield, N. J.

Send this coupon with your letterhead or business card for our special offer. You are sure to receive an unusual present. No obligation.

Name .....

Address .....

.....

☐ Proprietor ☐ Service Manager ☐ Shop Foreman ☐ Mechanic

Say "I saw it in FLEET OWNER"—It Helps!

Analyzing Truck Brake Failures

(*Continued from page* 18)

pass. Another east-bound truck stopped in the rear of the one parked at the curb, started up and endeavored to pass through the space mentioned. The left rear wheel struck the ice carrier and pinned the helper against the step of his own truck, fatally injuring him.

Cause:—When this truck started, its driver could not see whether his truck was clearing the ice carrier because the mirror was not extended out far enough. A citizen who observed the accident stopped the driver.

The driver's excuse for not having a longer arm on the mirror was that due to lack of space in the garage the mirrors cannot stick out any further than the width of the truck.

Result of Test and Examination:—Both brakes were found defective. The foot brake stopped the truck in 88 feet, 8 inches, and the emergency brake in 99 feet, from a speed of 14 miles per hour.

Causes of Brakes Failing to Function:—Scored drums and improper adjustment on the foot brake. Lining saturated with grease on the emergency brake. Inspection of transmission showed excessive oil. Same test in the rear end showed excessive oil.

Defective Signalling Device:—A pedestrian crossing a street was struck by a truck and killed. Upon investigation the signalling device was found to be off the frame and under the seat. The car had defective brakes—car stopped in 85 feet upon applying the foot brake and 183 feet on the emergency brake.

Cause of Defective Brakes:—Lack of adjustment and grease on the bands.

Defective Steering:—Excessive play in the tie rods and drag link. Drag link of the same hooked with iron wire, allowing one wheel to point straight and the other off to a right angle. The steering wheel would have to revolve half around before action would take place.

Instruments for measuring the braking force of vehicles, loadmeters, and steel tapes are included in equipment of the Motor Vehicle Homicide Squad. Careful measurements are taken at the scene of the accidents and in many cases photographs are made.

Wherever mechanical defects are found, the results of the squad's examination are presented to the Magistrate presiding in the case.

(Editor's Note: The information contained in this article, which we take pleasure in publishing, for the general benefit of other Municipalities, Fleet Operators and Safety Departments, is released through the courtesy of Police Commissioner Edward P. Mulrooney, Police Department, City of New York, N. Y.)

Factors Affecting Fleet Lubrication

(*Continued from page* 24)

Further, in stabilizing your engine lubrication, it is necessary to drain the lubricant at definite periods. Some operators find it more advantageous to drain at 800 miles, 1000 miles, 1500 miles, 2000 miles, etc., while other companies find it necessary to drain each week or twice a month.

This drainage removed from the vehicles is unfit for additional lubrication due to its becoming contaminated with dilution, water vapors, road dirt, asphaltic material, metal particles, carbon and combinations of some of these materials in the form of sludge.

Except for these contaminations, the oil most likely has actually been improved in its quality as the engine in which the oil is used exerts a combination of pressures and temperatures on the lubricant which removes the weak or unstable particles of the oil, leaving only that portion of the lubricant which is able to withstand actual operating conditions. This is in a sense continuing the refining process.

Therefore, you have spent good money for a lubricant, have improved it by exerting additional refining processes upon it, but due to the accumulation of contaminations, you discard it as useless.

Hundreds of fleet operators have gone further in their lubrication, and instead of throwing away their drained oil, they remove the contaminations built up during its usage. The equipment for removing injurious materials from drainage oil is available in various sizes, according to the requirements of the fleet operator. The operation of such equipment is practically automatic, and the cost per gallon of oil restored totals but a few cents. Thus such equipment makes economically practical, the purchasing of the *best* oils for the individual operator's requirements without regard to first cost and permits changing of the lubricants at intervals sufficiently frequent to insure proper lubrication of every vehicle at all times.

From this practice there naturally follows a two-fold saving: First, in the average operation, oil purchases are normally reduced 50 per cent. Second, there is an appreciable saving in reduced maintenance expense naturally resulting from the *improved* lubrication.

(Editor's Note:—The reclamation of crankcase drainings is rapidly becoming universal practice in all classes of fleet operation. We have sent literature on the subject of oil reclamation to hundreds of operators, by request, in the past and this service is still available. Just drop a line to the Editor, on your letterhead, and we will see that you get full details on oil reclaiming, without obligation.)

Idling Motors or Anti-Freeze?

(*Continued from page* 22)

ing more acute the longer the system is neglected. Everybody knows that water corrodes iron and practically all natural waters also corrode radiator metal with a rapidity in direct ratio to the amount of inorganic salts in the water used.

This constant chemical action is responsible for the rust and other corrosive products found in cooling systems. It also makes advisable the flushing of cooling systems at regular intervals.

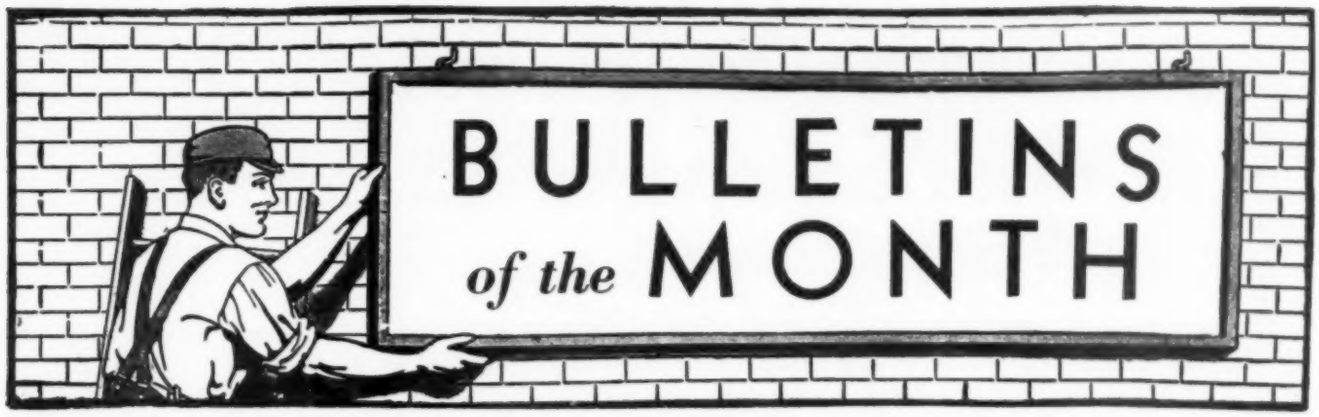
A maintenance schedule of cooling system flushing for each unit every three months will avoid the troubles caused by excessive rusting. At the very least, this should be done twice a year. Corrosion can also be kept in check by the repeated use of small quantities of cutting oil in the cooling system, or one of the standard rust inhibitors now on the market.

Because of the basic changes in the permanent anti-freezes, as well as the improvements and changes in design of commercial power plants, fleet operators must revise their winter operating and maintenance schedules. Careful consideration should be given the 1932-1933 anti-freezes from both an economic and operating point of view before again setting out on the old policy of idling motors into the repair shop.

Of course, it is inadvisable to load old units with comparatively expensive anti-freeze if they are of such design or in a condition which will prevent the satisfactory use of this money-saving material. But the new units are designed for and deserve proper service, and in these days of necessary conservation of rolling stocks, operators are missing a bet if they do not take time to carefully consider the proper maintenance of cooling systems as one way to reduce overhead.

Although freezing weather has not come yet, it is not too early to think about approaching winter and the ef-

(*Please turn to page* 50)



THE merging of stockholders' interests of The White Motor Company, Cleveland, Ohio, with The Studebaker Corporation, South Bend, Ind., was announced last month. The identity of the White organization as an operating unit will be maintained, as will be Studebaker, Pierce-Arrow and Rockne units, the announcement stated. The merging of these companies is prompted by advantages in purchase of materials and by enlarged and intensified distribution.

THE 23rd Annual Automobile Shows will be held next year as follows: The New York Show will be held in Grand Central Palace, January 7th to 14th, 1933; and the Chicago Show in the Coliseum, January 28th to February 4th, 1933. As usual, they will be held under the auspices of the National Automobile Chamber of Commerce.

COMMERCIAL car sales in Canada are usually a good gauge of business activity. Recent purchase by Robert Simpson Company, of ten General Motors trucks for their Montreal store is taken to be an indication of increased retail deliveries in that city. The trucks are all of the panel delivery type and will be used to supplement the large Montreal fleet of the Simpson department store.

RESIGNATION of F. L. Rockelman as president and general manager of Plymouth, was announced last month. He will become associated with Continental Motors Corporation in connection with a new development of great importance in the motor industry, announcement of which is expected to be made in the near future. For many years Mr. Rockelman was sales manager of the Ford Motor Company.

EARL W. WINANS has been appointed chief engineer of the Federal Motor Truck Company, Detroit, Mich., following the resignation of George B. Ingersoll. This announcement comes from M. L. Pulcher, president of Federal.

COMMERCIAL use of highways has become so much a part of the nation's transportation system that commercial vehicles now pay more than a fourth of all motor vehicle taxes. The demand for quick, direct delivery recently led the railroads, through the Railway Express Agency, to establish inter-city express trucking service between Milwaukee, Chicago and South Bend. This activity may become national in scope.

THE Joint Trade Show of the National Standard Parts Association and the Motor & Equipment Manufacturers' Association will be held in Detroit, this year, from December 5th to 10th, inclusive. Many important service developments and improvements will be announced, and we understand that there will be an open "fleet owner's night."

OPTIMISTIC about the future of business, Bloomingdale's (a New York City department store) has added thirty new trucks to its delivery service. They are 1½-tonners and are painted in the store's traditional green with cream trimmings. These trucks are now in service throughout the five boroughs of the city and also in Westchester County. Michael Schaap, president of the store, seems confident of an immediate upturn in business.

ANNOUNCEMENT is made of the appointment of W. S. Lantz as regional truck representative in the Detroit territory for Dodge Brothers Corporation. Mr. Lantz will have headquarters in that city and will have complete charge of all truck sales matters, including the supervision of truck sales representatives.

THE Greyhound Bus Company has purchased a fleet of Plymouth cars from a Cleveland, Ohio, dealer. The cars will be used in many various ways. They are coupes and are painted in the Greyhound color scheme, a Plymouth bulletin states.

COMPLETE reversal of the present concept of engine design will give the 12-cylinder engine of tomorrow the power of today's sixteen, according to a report of experiments conducted in the engineering laboratory of Ethyl Gasoline Corporation. The 33 per cent increase in power, the engineers declare, will be produced by improvements in the cooling system.

ANNOUNCEMENT is made of the appointment of Bendix-Cowdrey Brake Tester, Inc., as national distributor of the wheel alignment equipment made by A. E. Feragen, Inc., which has for several years past been distributed by Motor Wheel Corporation of Lansing, Mich. This change has been made because of the intimate relationship existing between brake service and wheel alignment service. All correspondence should now be addressed to the Bendix-Cowdrey Organization, South Bend, Ind.

THE Tru-Stop ventilated disc brake can now be supplied as optional equipment on Studebaker Trucks, according to advices emanating from American Cable Company, Automotive Division, Bridgeport, Conn., which company points out that this brake is more than a mere "parking" brake—a real emergency brake built for modern speeds and traffic conditions. Full details of this brake will be sent on request.

FIVE jobbers have recently been admitted into membership in the National Standard Parts Association. They are: G. & H. Machine Company, Bronx, New York; Iowa Auto Market, Inc., Des Moines, Iowa; National Automotive Equipment Co., Chicago, Ill.; W. W. Leach & Co., Fall River, Mass.; and Puritan Parts Corp., Detroit, Mich.

EUGENE M. MILEY, brother of the late Louis J. Miley, pioneer brake lining manufacturer, has been elected to head the L. J. Miley Company, Inc., Chicago, Ill. This Company manufactures "Ebonite" brake lining. In his new capacity, Mr. Miley will be supported by the full personnel of the Miley Company, since the "depression" has not caused the dropping of a single employee from the Miley outfit, a factory announcement states.

FIFTEEN new Chrysler Eight sedans were recently delivered to the New York City Police Department by Chrysler distributors in Greater New York. These vehicles will be used for police work where great speed is required on emergency runs, it is announced.

A NEW two-reel motion picture film entitled, "The Making of an All-Steel Body" is the latest addition to the list of films visualizing the mineral and allied industries, prepared under the supervision of the United States Bureau of Mines. No charge is asked for the use of this film when used for exhibition purposes by business organizations.

ADVERTISEMENT: We are in need of a good practical operation and maintenance man to take charge of our bus and truck operations consisting of 350 miles of lines, with proposed extensions pending that will more than double our present operations, and with further unlimited possibilities. Wonderful opportunity for right man, but who must have some cash and become stockholder in the company. For full particulars address the Editor.

Maintaining an Oil Fleet

(*Continued from page* 12)

on this point and only select men for this class of work who have been well trained, particularly for such specialized services as brakes.

In addition to this particular training, we make available to these men detailed mechanical specifications and instructions as to how to take care of the various types of units that are built into the machines themselves. On such work as lubrication, we have our apparatus set up so that washing, as well as lubrication can be done on a moving production line, and the men are all experts as a result. This type of operation has proven very successful.

Believing that a mechanic becomes more skillful and better able to turn out a satisfactory job as his knowledge of a specific group of units increases, such as engines, rear axles, transmissions, etc., our motor vehicle department follows the practice of giving all work on similar units to the same men.

All rear axles, regardless of size or manufacture are overhauled by the same mechanics, the rule applying also to engines, transmissions, steering gears and body work. Two of the advantages to be gained by using this system are that the workers, becoming more skillful, better jobs are turned out in a shorter time, and each mechanic has only the special tools necessary for the particular unit he works on.

Eliminating Gas Fumes in Buses

(*Continued from page* 16)

The greatest difficulty with this device is its maintenance. Although the stack is covered, it is easily damaged in the event of a collision with other vehicles from the rear. Once this occurs, the operation of the system is materially impaired, as any reduction in the diameter of the pipe results in a back-pressure on the escaping gases.

The purpose of the fins which were installed in the exhaust pipe was to decrease. by means of cooling, the pressure and volume of the gases. A section of exhaust pipe 24 in. in length was fabricated with 32 fins spot welded to it, spaced ¾ in. apart. The ends of the pipe were made up with the necessary flanges, and the entire assembly was installed just ahead of the muffler, which is our own design. The results obtained were very good. Much of the "rap," or machine gun effect which had previously characterized the performance of the buses was lost, and the density of the smoke was reduced. These cooling fins in the exhaust pipe are now standard on all of our buses.

The field entered into when it was decided to use "activated" carbon was quite apart from anything previously attempted by our company. This test was made for the purpose of removing, by catalytic action, the odorous unburned gases and light oil vapors present in the exhaust.

The device developed for this purpose was made up of blank sections of a standard muffler. In each end was placed a piece of 30-mesh Nichrome wire screen of the same diameter as the shell. Between the ends and the screen pieces were springs. When the "activated" carbon was placed in the device between the pieces of screen and the springs were released they exerted sufficient pressure on the screens to keep the carbon in a packed mass, leaving only the spaces between the carbon sections for the passage of exhaust gases. The device was then placed in the exhaust line so that all the exhaust gases would necessarily pass through it.

In service with the desired contact satisfied, the gases pass out the tail-pipe with only slight odors. The amount of smoke has been reduced to a minimum. Two of these devices are in service at the present time, both on double deck buses. One of these buses had recently been completly overhauled; the other had run approximately 26,000 miles in service and was classified as a "smoker." After the installation of the catalyzer there was a remarkable reduction in the smoke and odor on the long service bus, while there was little of either in evidence in the bus which had recently been overhauled. This experiment can fairly be said to have been very successful.

The use of an exhaust gas analyzer, or an air-fuel ratio analyzer, is expected to materially aid in setting carburetors for greatest power and maximum economy, as well as to reduce the odors present in exhaust gases when a large percentage of unburned combustibles are present.

This device operates by the effect on an electrical unit of the latent heat in unburned or partially burned gases. By means of a galvanometer, the scale of which is graduated in air-fuel ratio, a reading is obtained to show whether the carburetor is adjusted "lean," "rich," or "normal." By obtaining a "normal" reading on the galvanometer scale, the desired results are obtained as far as is practically possible without impairing the efficiency of the engine. There is, however, a noticeable difference in exhaust odors between a properly adjusted carburetor and one improperly set.

Investigation was also undertaken to determine whether a scientifically set carburetor would in any way cut down gas fumes or reduce the dense smoke emanating from the exhaust pipe. A Safeway Six-Wheel double deck bus, equipped with a 15H Continental engine, 4½ in. bore, 5¾ in. stroke, was chosen for the purpose of making this test. This bus had been in service for 24,276 miles since having its last engine overhaul. The carburetor, an OT4 Stromberg, 1¾ in., was first adjusted in the garage. using an exhaust gas analyzer, so that the following conditions prevailed:

Idling 13.2: 1 air-fuel ratio
Racing 13.6: 1 air-fuel ratio

The bus was then taken out on the road and another check made of the carburetor setting with the bus running. The same results were obtained on the analyzer instrument. The ignition timing had been set so as to give the best possible performance.

Observation was then made of the discharge from the exhaust pipe when "drifting" to a stop, using the engine as a brake, and when accelerating after "drifting," the bus not coming to a standstill, as when slowing down in traffic. It was found that the performance of the bus was perfectly satisfactory when handled properly. The carburetor could be made to "pop back" if, after drifting or when starting under load the accelerator was immediately crowded to the floor. The engine had to be accelerated in a smooth manner in order to get the best results.

The discharge from the exhaust pipe had no objectionable odor and was invisible. No "smoke" could be seen when drifting to a stop, and a very little when accelerating immediately after drifting without coming *to* a stop.

All tests made to date proved to be of direct benefit or have verified theories sufficiently to justify making further experiments. It is felt that by a combination of two or more of the devices already tested, a means can be arrived at by which the baffling problem of "gassy buses" can be definitely settled. Further experiments with this end in view are now in process of development. From what has already been determined. the engineers

(*Please turn to page* 50)

TROUBLE SHOOTER

(You Ask 'Em — We Answer 'Em)

A department, devoted to correspondence from readers of FLEET OWNER. Any questions having to do with automotive service will be answered in this department. All properly signed inquiries will be replied to by mail and such of them as are believed to be of possible interest to other readers will be published in these columns.

Burns Out Distributor Points

Question: We have a 1927 GMC 2-ton truck with a Buick Master Six Motor supplying the power. We have had excellent service most of the time the truck has been in use, but recently we have had considerable trouble with the points in the distributor burning out after about a week or ten days' service.

New coils and condensers have been tried out but the points still burn out and our maintenance mechanic is at a loss to know what to do to overcome this trouble.—H. & M. Co., Tacoma, Wash.

Answer: There is probably a poor ground connection somewhere between the condenser, distributor and the engine, that causes your points to burn out. If possible, try running a separate wire from the ground connection of the condenser to the engine block.

Another place to look is at the connections between the generator, ammeter and battery. Sometimes a loose connection in the charging circuit will burn out contact points, just as it will burn out lamp bulbs, because the generator sends out a high voltage which, by some defective connection, is not permitted to reach the battery.

We presume that you are using a good quality of contact points. If you are not certain of the quality, why not try changing the brand, although we cannot advise you as to any brand in particular. Should our readers have any further information on this difficulty, the Editor will be glad to pass your ideas along.

Are the Wheels in Balance?

Question: We are troubled with a high-speed shimmy on a Chrysler 70. The front wheels have been checked and caster, camber and toe-in are satisfactory. It runs well up to 40, when it starts to vibrate so that it can be felt in the steering wheel. Where did we fall down? —L. J. R., Fall River, Mass.

Answer: Care should be taken to have the same weight of tire on both front wheels. They should be free from extra weights such as blowout patches, etc. The amount of tread rubber on both tires should be as nearly equal as possible. A tramp or shimmy would be produced, for instance, if an eight-ply tire were used on the left front wheel and a four-ply tire on the right front wheel.

High-speed shimmy and tramp are quite often caused by an out-of-balance condition of the wheel and tire assembly. This lack of balance also causes uneven tire wear and shortens the life of the tires considerably. We believe your trouble lies as outlined above.

In order to assist you with future problems of shimmy and misalignment, we are sending you a copy of a "Wheel and Axle Manual" which explains all about toe-in, camber and caster and also contains a chart of wheel alignment specifications for all cars and trucks.

(Editor's Note: Should other readers desire free copies of the book which was sent to Mr. R., they can be obtained free for the asking. Just drop a line to the Editor, on your letterhead, and ask for the "Wheel and Axle Manual." There is no obligation, of course, this being a part of the service rendered to subscribers.)

Brake Service Hint—Model A Ford

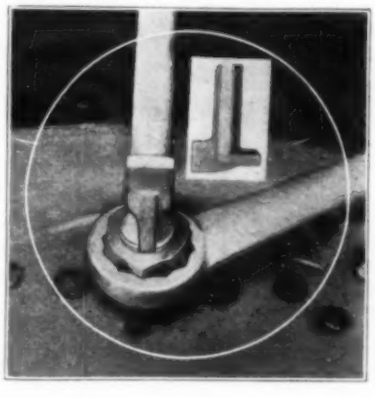
THE brake drums on the Model A Ford are pressed and are very often out of round. This condition produces squeaks and chattering and it can be cured by having the drums trued up on a lathe.

After this operation, it is not necessary to use over-size lining as there is plenty of adjustment on the Ford brakes. It is important to inspect the brake springs frequently as very often they lose their efficiency in a very short time.

Test the springs by inserting a screwdriver between the shoe and the cam. If the resistance is slight, replace the springs.

Adjusting Bendix Anchor Pins

INCORPORATED in the new 16-inch Bendix single-anchor duo-servo brake is an eccentric type anchor pin, which permits easy adjustment of brake shoes to compensate for lining wear.



To make this phase of servicing still easier for shop mechanics, the Bendix Brake Company, South Bend, Ind., has provided a special tool which is shown in the accompanying illustration. Its part number is 25397 and may be obtained through the service department of the company.

An Oil-Pumping Whippet Six

Question: We have rebored a Whippet Six and installed new pistons and rings and now the engine consumes more oil than before. I thought it was a bad set of rings, so installed a new set of —— oil rings. This stopped the oil pumping for 1,000 miles, but now it's as bad as ever. It uses a quart of oil every 50 miles. What do you suggest?—C. Y., Mamou, La.

Answer: Provided that your rebore job is o. k. and the rings properly fitted, and the engine given a chance to run in properly, your one best bet is to look at the connecting rod bearings. If there is too much clearance at the *sides* of the bearings, so that the bearings are egg-shaped, even though there is not excessive up-and-down clearance, this would cause oil to be thrown out on the cylinder walls in such quantities that no make of ring could hope to handle the excessive oil.

We would suggest that you check up on this, and if you cannot go to the trouble of putting in new bearings, it might be possible to minimize your difficulty by reducing the oil pressure at the oil pressure adjusting screw. A slightly heavier oil would also help in this instance.

Safe Braking With Free Wheeling

THE question of whether or not free wheeling is as safe as previous transmission systems, from the standpoint of stopping a car, has been answered by General Motors engineers following experiments with Chevrolet and other cars in recent weeks.

Old-time drivers accustomed to using compression of the engine as a retarding force in stopping were skeptical as to the ability of the braking system to perform properly without the aid of the engine, but studies at the proving ground have shown their fears to be unfounded.

From a layman's point of view, the actual difference between leaving the engine in speed with the car, or leaving it out, in stopping, affects the actual stopping range of the car so little that it would not be noticeable under normal operating conditions.

With the maximum braking effort at average driving speeds, it is found, however, that the car can be stopped more quickly in free wheeling than with the engine in speed. With only fair brakes, the difference is negligible, and with poor brakes, at speeds about 30 miles an hour, leaving the engine in speed will aid in stopping more quickly.

TROUBLE SHOOTERS' DEPARTMENT (*Continued*)

How to Adjust Acme's Pinion

Question: On a model 36 Acme truck, what is the correct way to adjust the rear axle pinion shaft for end play?—J. M. S., Haverstraw, N. Y.

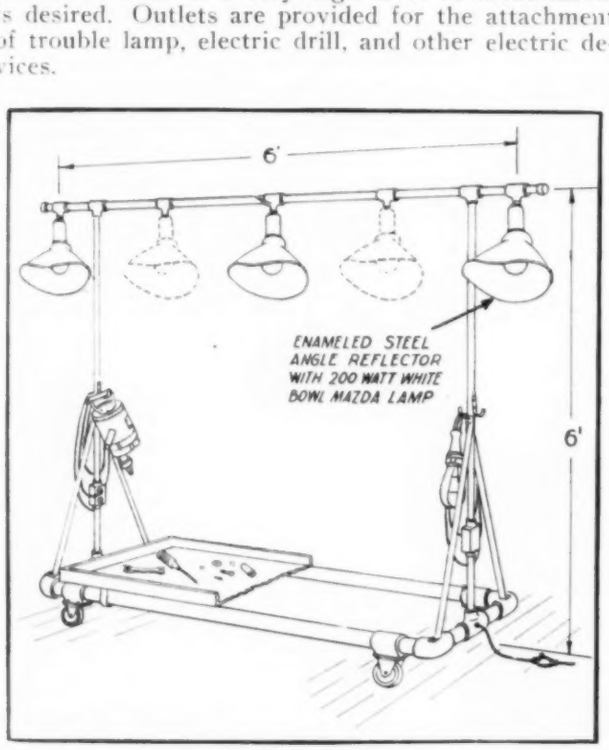
Answer: The rule for adjusting roller bearings applies here, which is as follows: Be sure bearing cone and cup are free from grit and then tighten the adjusting nut to a point where the bearing begins to bind; then slacken the nut off from a quarter to a half turn until the bearing turns freely. Then fasten it with the locking device.

On this particular truck, the pinion adjustment is made by removing a small cap or plate on the side of the housing and loosening the jam nut on pinion shaft and turning the adjusting nut to the right until the end play is taken out of the shaft. After making sure that it does not bind, set the jam nut up securely and the job is finished.

Making a Portable Lighting Unit

A PORTABLE lighting unit for the garage has been recently designed by W. Sturrock, of the Nela Park Engineering Department of General Electric Company, Cleveland, Ohio. This new equipment makes it possible to obtain an abundance of illumination when and where needed.

The sketch shows the manner in which the three reflectors, equipped with 200-watt white bowl lamps, are supported. Provision is made for the addition of two more units if a very high level of illumination is desired. Outlets are provided for the attachment of trouble lamp, electric drill, and other electric devices.



The equipment may be connected to the regular garage circuit. It is suggested, however, that unless it is properly fused, no additional load be placed on this circuit while the unit and its accessories are in operation.

The entire unit is supported on casters and may be easily moved from one location to another. In addition it is compact, provides directional light, eliminates shadows, which obtains when only one overhead unit is used, and may be inexpensively constructed by the use of 1-inch pipe and pipe fittings.

Motor Runs Without Oil?

DRIVING an automobile 745 miles without a drop of lubricating oil in the motor was a feat recently achieved at Halifax, Nova Scotia, according to a report of a test run published by the *Halifax Herald*. This is claimed to be the longest dry-motor run on record.

Mayor A. A. Thompson of Halifax, Dominion police and Canadian National Express officials witnessed the draining of the oil, sealing of the hood at the start and unsealing when the run was terminated, due to a broken connecting rod.

As an added test at the 400-mile mark, the oil-dry car was called upon to push for several miles a sedan carrying Edward S. Dixon, president of the Auto Legal Association of Halifax, sponsor of the run.

The motor of the test car was conditioned for 1,000 miles prior to the run by adding a new self-lubricating fluid perfected by W. V. Kidder, widely known motorboat racing authority of LaCrosse, Wis., to the regular oil and gas.

The previous dry-motor run record was 318.7 miles, made with a car processed with the same kind of fluid, at Elgin, Ill.

Timing an Autocar's Valves

Question: Can you give me the valve timing on a 1922 Autocar Truck? This is a four-cylinder job, with a 4 in. bore, model H or K, I am not sure which it is.—W. E. C., Orange, N. J.

Answer: The valve timing on this job follows: It should be remembered that the tappets must be adjusted to a clearance of .005 in. before attempting to time this engine.

Intake opens 10 degrees past TDC.
Intake closes 30 degrees past LDC.
Exhaust opens 35 degrees before LDC.
Exhaust closes 10 degrees past TDC.

The above valve timing applies to all Autocar engines that have the 4 or 4½-inch bores; also all years from 1922 to 1926 inclusive. We are giving you both the openings and closings, so that you can properly check.

A Hint on Curing Sticky Valves

"TO those who have a lot of trouble with sticky valves, here is a little remedy that has helped me considerably. By putting a split lock washer on the stem of each valve, it will eliminate the formation of carbon and prevent the valve from sticking.

"This is especially good on older cars and trucks where one does not want to replace valves and guides. You will not be able to hear the jingling of the lock washer on the stem—even on very quiet motors.

"This may not be new to some mechanics but doubtless there are some who would like to try it. I follow up the Trouble Shooters' Department closely but haven't seen this suggestion yet."—*Roy Kraklow, Garage Foreman, Luick Dairy Company, Milwaukee, Wis.*

WHAT DO YOU READ?

HERE'S a hand-picked assortment of literature that is offered to you entirely without obligation.

We've even made it easy for you to get it. Fill in the coupon below, mail to the Editor, and let us do the work. We'll ask them to send it at once and not to bother you with salesmen, either.

61. Getting After Mr. Emergency. Here's some new literature on a new type of emergency brake that will really stop your truck or bus in an emergency, we're told. We also have learned that it's quite easy to adjust it or reline it and that even your dumbest driver can do it while he's eating his lunch at the "Greasy Spoon." If emergency brakes have been a bane and bugbear to you in the past, this new literature, which happens to be No. 61 in our listing, will prove of interest.

62. Power Prover Proves Proper Power. Gasoline is exploded or burned in the engine to generate power. Usually, the gasoline is not completely burned and is carried out through the exhaust. How to eliminate this waste and hazard of dangerous fumes is but one of the functions of the "Power Prover." If your curiosity has been aroused and you have the slightest interest in what started out as a real tongue-twister, just place No. 62 on the coupon below and you'll get the dope without obligation.

63. Tire Wear on Trailers. Prematurely worn tires are costing trailer operators everywhere a good share of their profits every year. A special study of trailer tire wear has been prepared and an interesting book gives the correct remedies that will save operators lots of money. In fact, this book gives reasons that you never dreamed of. Cut down these losses and start now by asking for No. 63—it's free.

64. Warm Enough for You? Although it's about 90 in the shade while this is being written we know of some interesting literature on anti-freeze that all of us will soon have to think about. One of the claims of this particular anti-freeze is that it prevents corrosion. Don't expect it to cure Halitosis, Athlete's Foot, Driver's Back or Stenographer's Hangnails, however, but let the literature tell you how good it is supposed to be. Ask for No. 64.

65. No Time Like the Right Time. If you were told that all of your engines were running out of time, you would not believe it. If you want someone to prove this to you, fill in No. 65 on the coupon below. This is about something that will prevent "spark-knock" and allow your engines to develop the proper "power-curve." At any rate it's mighty interesting reading.

66. Truck-Built Trailers. We've always thought that if trailer parts were interchangeable with truck parts, it would be a good thing for all operators. Number 66 brings a set of interesting literature on a complete, new line of truck-built trailers. Begin now to increase your payloads by sending for this free information.

67. No More Fuel Pump Failures. Such is the claim made for a new fuel pump that is built without contact points, diaphragm, or bellows. It's an electrically operated job, too. If you would like to see how it works, just fill in No. 67 and you'll get the full details at once without obligation.

68. Live Wires. This time it is the name of a new talking picture, but it's one that you, as a fleet maintenance man, will be interested in. Number 68 will not only tell you where you can see it free of charge, but will bring a complete set of ignition cable bulletins as well. The picture tells about ignition cable troubles and points the way to surer operation and lower maintenance costs.

69. Potatoes are Cheaper. Yes, and so might insurance premiums be lowered. One of the factors bringing this about is the use of safety glass. Number 69 will bring, free of charge, an interesting set of literature on safety glass that ought to enable you to "chisel" some savings next time your insurance man comes around. At any rate, it's lots better to be safety-glass equipped and the literature will tell just what it costs.

70. Taking a Slap at Piston Slap. The title is ours, but the device is Perfect Circle's. This prominent piston ring maker has combined its resources to produce a really effective piston expander to overcome even the worst cases of piston slap. Just jot down Number 70 on the coupon below and you'll get the dope without obligation. If you want a free piston ring size book, add Number 70a.

71. Air-Fuel-Ratio-Analyzer. Whoa! Don't think we're going high-hat with a lot of high-sounding engineering terms, for we're not. This literature describes an interesting device that enables even your dumbest mechanic to make the most efficient carburetor adjustment with his hands tied. It also, if properly used, will bring about considerable gasoline savings in your fleet. This is not a trick carburetor mixer, but is a scientific instrument built into inexpensive, practical form, especially for fleet owners. Number 71 will bring the full details and you needn't feel obligated, either.

72. Shop Kinks for Chevrolet. Don't tell us that you have no Chevvies in your fleet. Most fleets have 'em and for this reason we think this new, illustrated book of short cuts in servicing will appeal to a majority of our readers. Number 72 brings it without charge, but here is the catch: It also illustrates and describes several new tools especially designed to make Chevrolet jobs easy ones. The tools are illustrated, described and priced, but you don't have to buy any in order to get the book, which is free.

73. Cooling System Manual. Each year at this time a manufacturer of anti-freeze brings out a well-written book on cooling system servicing. It tells you how to get the most out of your anti-freeze during the winter months, and, regardless of the brand of anti-freeze you will use, it contains a lot of information on radiators, water pumps and related cooling system parts. Number 73 brings this manual, free, of course.

74. Windshield Wiping a Cinch. Here's a new heavy-duty windshield wiper that looks like it will really remove snow, ice, sleet and water from your windshields, no matter what your experience has been with previous wipers. It's claimed to be fool-proof, too, since it's not electrically, air or vacuum-operated. Puzzle: How does it work? For the answer just fill in the coupon with No. 74.

The Editor, ... 1932
FLEET OWNER,
90 West St., New York, N. Y.

Kindly send me without obligation, the following free books mentioned in the.....issue. (Literature will not be sent unless firm name is given.) Order by number.

....

....

....

Firm Name .....

Address .....

City and State .....

Your Name .....Position .....

for ROAD *and* SHOP

Cinch Windshield Wiper

A NEW heavy duty, hand-operated windshield wiper for trucks and busses has recently been placed on the market by Cinch Mfg. Corp., 2335 W. Van Buren Street, Chicago, Ill.

This wiper cleans downward and leaves a clear area of 2 square feet. It is easily operated and automatically returns to the top of the windshield. The blade is 24 in. wide and has a 12 in. vertical travel.

The Cinch Mfg. Corp. will be very glad indeed to send full details on request, without obligation. When writing them, you'll mention FLEET OWNER, won't you?

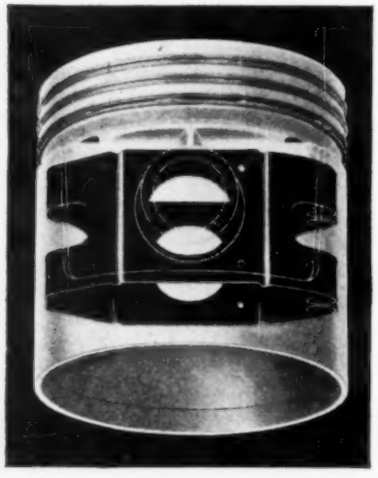
Perfect Circle Piston Expander

A NEW product has just been announced by The Perfect Circle Company, manufacturers of piston rings. This is a piston expander for installation inside used aluminum pistons. Its chief function is to restore the piston to its original fit and stop piston slap.

Many thousands of miles of road work and laboratory testing went into the perfection of this new expander which is different in design than any other expander on the market. Due to its central location inside the piston skirt, it correctly expands the piston over the entire skirt, thereby assuring full cylinder contact. Other features of this expander are as follows: it is made of spring steel; no machining is necessary for installation; the expander is securely locked in place by the piston pin; and it is unconditionally guaranteed.

The first expander to be developed is for the Model A Ford which uses a split skirt aluminum piston. Expanders for other cars are being developed at the present time. Due to the fact that all cars do not have the same piston design, new expanders will be developed for each different kind of car.

The new Perfect Circle product will be sold through the company's present distributing system, namely automotive parts and equipment jobbers. Full details and prices will be sent upon application to The Perfect Circle Company, Hagerstown, Ind.



Ring Gear Riveting Attachment

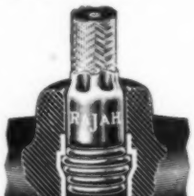
A NEW riveting attachment for handling ring gears has been developed, which embodies ease of handling, efficiency, and strength of construction.

The lower anvils of this riveting attachment are a part of a steel turret, which rotates, and makes it possible to easily align the size die desired with the corresponding upper rivet die.

The upper die is held by a spring in a strong upper arm, or guide, so that the rivet may be placed in position with one hand, assuring perfect alignment.

The entire tool is sturdy, and may be used on practically any press. Catalog page telling the full story may be had by writing to The Manley Manufacturing Company, York, Pennsylvania.

This Terminal Will Stay Put



THIS new type of distributor terminal has been developed to overcome the disadvantages of the ordinary terminal. It is guaranteed to "stay put" and will not jump out of the distributor cap socket, according to The Rajah Company, Bloomfield, N. J., who have recently placed it on the market.

The new Rajah Universal Distributor Terminal will fit all types of ignition distributors and is made of an ingenious brass spring, attached to a regular Rajah ferrule.

Easy attachment to cables is permanently made by using the Rajah Hand Crimping Tool, illustrated and described in a recent issue.

Readers are invited to write for free samples of this terminal, addressing either the Editor, or the Rajah Company, Bloomfield, N. J. You'll mention this publication, won't you?

Wheel Puller for Fords

A NEW wheel puller has been developed for the new Fords by National Machine & Tool Company, Jackson, Mich.

The wheel puller will remove the hub and wheel together, and is built for heavy work, according to the makers. The jaws are easily adjusted and there are locking screws at each end of the puller, which prevent the fingers from spreading or slipping when attached to the wheel.

The fingers are drop-forged from chrome-nickel steel. The heat-treated center screw is also chrome nickel steel. Further details will be sent on request without obligation.

NEW STUFF *for* ROAD *and* SHOP (*Continued*)

Valve Insides in Metal Boxes

A NOVEL and practical method of packing tire valve insides for fleet owners and other bulk users, is announced by Peck Spring Company, Plainville, Conn.

The valve insides are available in four sizes of boxes, containing 100, 250, 500 or 1,000 pieces, respectively. The boxes are of strong, heavy-gauge metal, with securely fastened cover, held closed by a positive snap.

Some of the features claimed for Peck Valve Insides are: Collars cut and pierced from live India rubber, *not* moulded; rubber valve seats are also cut and pierced from live India rubber; phosphor-bronze spring; coil plug, also of phosphor bronze, fastened securely to spring to prevent sticking; interchangeable with any valve inside in any tire valve.

A sample set of Peck Valve Insides is now offered free to any fleet operator, for test purposes. If you have not received your free set write to Peck Spring Company, Plainville, Conn., mentioning this publication. The Editor will get a set for you, if you prefer.

Motor Drive for Grinder

THOSE fleet owners using the new Sunnen Pin Hole Grinder will be interested in learning that they can now obtain a motor drive unit for this piece of equipment.

The motor drive unit consists of a special bracket for mounting motor on pin hole grinder, two pulleys, belt, pulley disengaging spring and a ¼ h.p. 110-volt A.C. General Electric motor.

According to the manufacturer, this new motor drive offers still greater convenience and increased speed in fitting piston pins with positive accuracy. The motor drive makes the operation of the pin hole grinder smoother, more quiet and increases the cutting speed as much as 50 per cent, it is claimed.

The shaft of the motor on this unit has been extended so that a 4 in. wire carbon cleaning brush can be mounted on it. This brush provides a handy means of cleaning carbon off valves, etc. For details and prices, write to Sunnen Products Co., 7911 Manchester Ave., St. Louis, Mo.

AC Spark Plug Cleaner

A SPARK PLUG cleaning machine built on an entirely new principle is announced by the AC Spark Plug Company, Flint, Mich.

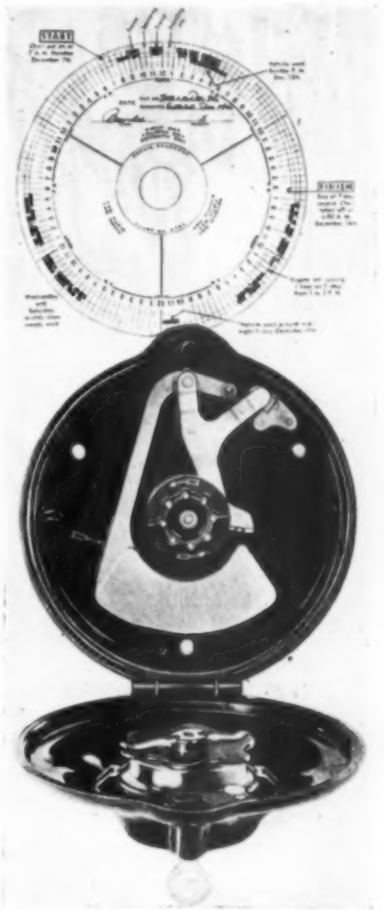
The machine, which will clean a plug in a few seconds, is so constructed that the proper cleaning operation does not damage the spark plug porcelain. This is possible because of the design of the device and the use of a special cleaning compound. The cleaning compound is blown against the plug by air pressure in such a manner that carbon and oxide coatings are effectively removed from the porcelain insulator and from the plug shell.

Introduction by the AC Spark Plug Company of this scientifically designed spark plug cleaner adds an important mechanical tool that will be a boon to the fleet service field.

A great need has existed for an efficient machine that would successfully clean spark plugs, and the AC device is certain to meet a most welcome reception from the fleet service industry generally.

The problem of cleaning both one-piece and two-piece spark plugs has always been an important one. The one-piece plug can now be thoroughly cleaned with the new machine in only a few seconds, thus saving valuable time in the operation. Similarly, the two-piece plug can also be quickly cleaned without taking it apart, again saving much time and with avoidance of the plug being loosely reassembled. Full details and prices sent on request without obligation. Write directly to AC Spark Plug Company, Flint, Mich.

New Model "Servis Recorder"



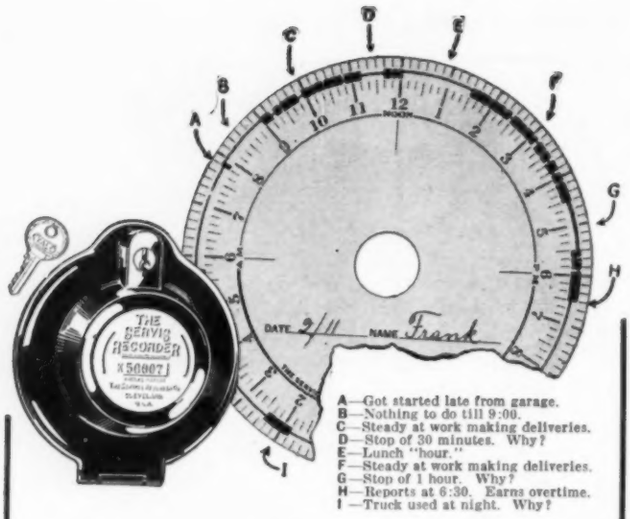
THE Service Recorder Company of Cleveland, Ohio, have recently brought out a new model which is different from any they have heretofore offered. This new recorder makes a 3-day or 7-day record of truck operation on one big 6 in. chart. The picture herewith shows such a chart and also the mechanism which makes possible this kind of record.

It's accomplished by "winding up the marking device" (elevating it) as well as winding the clock mechanism. Then when the clock unwinds, it also "unwinds the marking mechanism" (causing it to descend).

This new recorder will make life a lot easier for the man who used to have to change the charts every 24 hours. In the old model it would spoil the previous day's record to leave the chart on longer than 24 hours.

A new booklet entitled "Ten Ways of Getting More Work Out of Trucks" has just been issued and is offered to our readers, free. Write to The Service Recorder Co., Hanna Bldg., Cleveland, Ohio, for complimentary copy.

AN improved steering gear, described as the solution to the new steering problems introduced by super-balloon or "doughnut" tires, has been recently perfected by Gemmer Manufacturing Company. It is stated that this latest type of steering gear has already been adopted as standard equipment by manufacturers of vehicles. The new gear is of the worm-and-roller type.


A—Got started late from garage.
B—Nothing to do till 9:00.
C—Steady at work making deliveries.
D—Stop of 30 minutes. Why?
E—Lunch "hour."
F—Steady at work making deliveries.
G—Stop of 1 hour. Why?
H—Reports at 6:30. Earns overtime.
I —Truck used at night. Why?

What's Your Truck Doing All Day?

This Little Device Tells Every Move the Truck Makes

SEE THAT CHART. Those wide heavy marks show just when your motor truck was working, and how long. In between are blank spaces that show idle time. The result is a complete record, in fact, a picture of just what your truck did all day and all night. The truck "writes" its own story. Simple, isn't it?

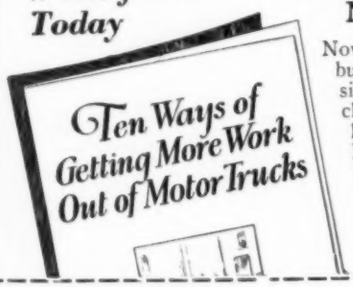
Save $500 Per Truck Per Year

Motor trucks are expensive to operate. The running time of a truck costs from $3.00 to $5.00 an hour! That's why delays, *avoidable* delays, are so costly. Half an hour per day *avoidable* idle time easily costs you $500 per year. It's a big loss. That's why over 70,000 trucks are already *Servis Recorder* equipped.

All You Need Is a Screw Driver

The little *Servis Recorder* that produces this "Busy-Idle" chart is attached to the truck merely by a couple of screws—why, you could even *nail* this *Servis Recorder* on your truck.

Write for it Today



New 7-DAY Model Now Ready

Now you can get a 7 days' busy-idle record on a single chart without changing. When you lock the new 7-Day Recorder, you don't have to touch it again for a week! The coupon brings the the whole story.

THE SERVICE RECORDER CO., F.O.2
Hanna Bldg., Cleveland, Ohio
Please send us, without obligation, "10 Ways of Getting More Work Out of Motor Trucks." Also information on the new 7-Day Model.

Company .....
Attention of .....
Street .....
City and State .....

The Service Recorder Company
Cleveland. Ohio

THE SERVIS RECORDER
"Keeps Trucks Busy"

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"FLEET OWNER"

They'll Appreciate It!

VELLUMOID GASKETS

For the Oil, Gasoline, and Water Connections

QUALITY GASKETS

which you can absolutely depend on

At a very small cost, you have in Vellumoid gaskets a product you know you can absolutely depend on. Whether the gaskets are ready-cut, or cut or tapped out from the sheet, you know you have tight Oil, Gasoline, and Water connections which ***stay tight.***

• •

Stock Vellumoid ready-cut gaskets for the cars, trucks, or busses in your fleet, and sheet Vellumoid, from which you can quickly cut or tap out any gaskets desired.

Ask your Jobber

VELLUMOID
THE REAL REPLACEMENT GASKET MATERIAL

The Vellumoid Co., Worcester, Mass.

SERVIDOR-EQUIPPED

Every room in Hotel Fort Shelby is servidor equipped. This eliminates excessive tipping and insures the guest's privacy. Hotel Fort Shelby was the pioneer in installing this notable convenience eliminating any need of annoying intrusions. ¶ No other hotel in Metropolitan Detroit is so near the principal railway terminals, airports and steamship piers. Hotel Fort Shelby's location in the heart of the motor city's shopping, theatre, financial, insurance and wholesale districts is a happy one. ¶ You'll be delighted, too, with the efficient . . . unpretentious service offered by this truly fine hostelry. 900 rooms . . . all with private bath and circulating ice water. Rooms as low as $3.00 per day . . . suites $10.00 and upwards.

Motorists are relieved of their automobiles at the door without service charge. Write for free road map, and your copy of "Aglow with Friendliness," our unique and fascinating magazine.

HOTEL Fort Shelby
"AGLOW WITH FRIENDLINESS"
E. J. BRADWELL, Manager
DETROIT

Eliminating Gas Fumes in Buses

(*Continued from page* 42)

of the Third Avenue Railway System feel justified in submitting the following recommendations:

1. Body construction should be such as to leave no places for seepage, such as through the floors or around the wheelhouses.
2. The use of a stack is beneficial, but does not fully solve the problem.
3. The use of devices for introducing excess air into the intake manifold at the time of maximum intake depression are not wholly satisfactory, and the net result is of little or no benefit.
4. The use of catalyzers to remove the odor from the exhaust warrants further study and investigation.
5. The combination of careful engine inspections, correct ignition and scientific carburetor adjustments gives a very satisfactory result.
6. Operators of vehicles should be taught to accelerate engines in a normal manner and not cause an abnormal condition by opening the throttle wide immediately when it is desired to accelerate the engine. This condition can be brought about by carburetors which make it impossible to speed up the engine by immediately opening the throttle to its full open position.

Taxicab and Automotive Development

(*Continued from page* 20)

placement of the entire motor in the event of damage.

14. Considerable credit is due to taxicab manufacturers for the development of a body equal to the seven-passenger car but built on a 122 to 125 inch wheelbase. The normal private seven-passenger car is 130 inches but city traffic conditions require a taxicab to have the shortest wheelbase possible.

Practically every 1932 modern passenger car has all or nearly all of the improvements noted above. While many engineers have been working on the problems of automobile manufacture in many plants here and abroad, the taxicab builder is largely responsible for the elements which produce durability, comfort and safety.

Idling Motors or Anti-Freeze?

(*Continued from page* 40)

fect of cold weather operation on automotive equipment. During the last couple of years, much research and investigation has resulted in greater knowledge and better understanding of truck and bus operating problems.

The business of building trucks and buses, and of operating them, has changed, just as many other businesses have changed in this period. The truck and bus is fast passing out of the thundering, lumbering, Behemoth stage and is becoming a fast, quiet efficient piece of equipment, that no longer batters itself to pieces on its appointed route.

Makers have even considered the comfort of the drivers in terms of their greater efficiency and have designed cabs and seats and controls to reduce the fatigue of operation to a minimum, in order that drivers may be more alert and efficient both in operating and in preventing accidents.

We are rapidly approaching the point where a truck or bus receives the same type and quality of maintenance service previously accorded to practically only the more expensive passenger cars. In fact, today many truck and bus fleet garages operate on a far more efficient maintenance schedule than many passenger car dealer establishments, due largely to intelligent personnel and modern service facilities.

Public Opinion

DEMANDS POWER BRAKES

. . . bigger value and lower prices

POWER BRAKES are here. Far from being strictly "commercial" equipment, they have caught public interest as being wholly necessary to safety and effective car-control.

The answer is B-K Vacuum Power Brakes — simple, low cost, efficient for the life of the vehicle; using the intake-manifold vacuum as power to apply the brakes — "more power to the right foot."

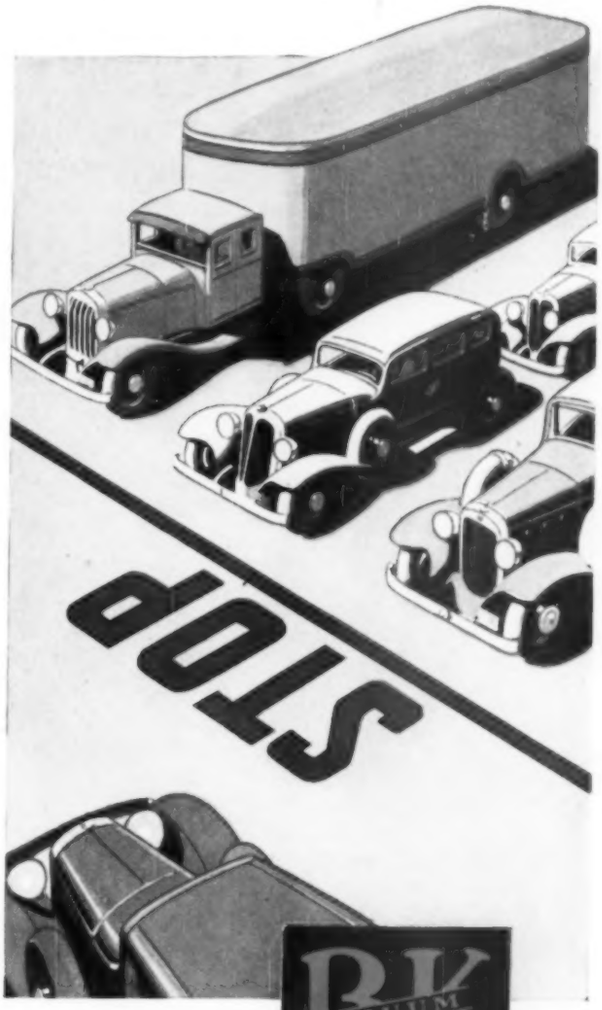
And now comes the best news in years for commercial operators—Super-Vacuum Power; providing 100% power for brake operation.

You're familiar with the many recognized B-K advantages—least weight; lowest first cost; minimum maintenance; instant remote control; universal adaptability to brake systems — on any truck, tractor, bus, or car; all emergency "train" advantages.

Best of all, important price reductions make B-K equipment the preeminent value.

For B-K's complete engineering cooperation, for new equipment or for field installations, get in touch with the B-K distributor or write us.

WATCH THE COMING AUTOMOBILE SHOWS



Specify **B-K**

BRAGG-KLIESRATH CORPORATION
South Bend, Indiana
(Subsidiary of Bendix Aviation Corporation)

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